Conquering SAD

Colouring your way to light

Fiorenza Marani
2019

Title

Conquering SAD
Colouring your way to light

Author

Fiorenza Marani

LEVEL
Master Thesis for Master of Arts

UNIVERSITY
Aalto University

SCHOOL
School of Arts, Design and Architecture

DEPARTMENT
Department of Design

LANGUAGE
English

PAGES
98

DEGREE
Fashion, Clothing and Textile Design Program

YEAR OF SUBMISSION
2019

SUPERVISOR
Maarit Salolainen, Adjunct Professor, Department of Design

ADVISORS
Hilka-Maija Fagerlund
Anna Alanko

Heartfelt thanks to

Hanna Hakala
Hilkka-Maija Fagerlund
Anna Alanko
Maarit Salolainen
Federica Cattaneo
Lauri Koistinen
Federica Cattaneo
Valentina Dipietro
Laura Arpiainen
Francesca Cacciamatta

SAD
Seasonal Affective Disorder

Abstract

Seasonal Affective Disorder is a type of depression whose level of diffusion is in between 1% and 10% of the population (Meesters & Gordijn, 2016). The goal of this study was to discover whether the scarcity of subtractive colour causes fall and winter SAD together with the scarcity of light. It also examines the ways to alleviate winter Seasonal Affective Disorder symptoms through the use of colours in domestic interiors in applications such as textiles and wall coverings. The design outcome of this project are two collections, one for the living room and one for the bedroom. Each collection comprehends ten patterns, three material boards and three colour schemes proposals.

Data was collected through a background research, one personal meeting with an expert in human-centred living environment, two personal meetings with an architect and a questionnaire. Such methods resulted being useful to collect information about the thesis topic. However, more interviews with colour experts, interior designers and architects should have been done in order to gain further specific information about the use of colour in interiors with therapeutic purposes. Indeed, most of the research had to concentrate on the topic of colour because of the complex nature of this phenomenon. For this reason, less time was dedicated to the study of colour and patterns for domestic interiors and to the production of the print collections.

The research done on the topic of Seasonal Affective Disorder shows that traditional medicine does not give relevant attention to the use of colour in order to cure or alleviate Seasonal Affective Disorder symptoms although, at present, many researches show that colour can influence the human mind and body. Furthermore, disciplines like chromotherapy attribute to different colours the ability to cure specific areas of the body and specific ailments. Common alleviation cures for SAD symptoms suggest daily bright light sessions, healthy sleep-wake habits and other self help methods like exercise. However, no specific attention is given to the use of colours as a cure. Furthermore, the background research from the field of colour psychology and interior design shows that environment changes the mood of humans and that colour is a good influence on people's mood especially when it is liked. Indeed, it is possible to create domestic environments that will influence us according to what we planned. In order to do so, we can find directions from different fields. 1) Guidelines on the way colour influences human's mind and body, from the field of colour psychology and colour theory. 2) Guidelines on colour planning, from the field of interior design. 3) Guidelines on color combination and colour harmony from the field of colour theory and interior design. Additionally, for this project direct data was collected through a survey shared via mail with 20 participants from Finland (12), Italy (5), Taiwan (1), Corea (2). The age span was between 24 and 59, 3 were men and 17 were women, 17 lived in Finland and 3 in Italy. The survey investigated which colours people connect to the concept of energy or relax, which colours people would use in their homes to create energetic or relaxing atmospheres and which are the methods they find more useful to cope with winter darkness. The survey answers display that energy is linked mainly with yellows, relax with blues, convey energetic atmosphere with yellows and relaxing atmosphere with blues, greens and dark yellows and that the three most useful help methods according to the 20 participants are, in order of relevance: a) exercise, b) a walk outside, c) bright light therapy.

The research findings do not imply direct connections between SAD and the scarcity of colour during fall and winter. However, at the same time, they suggest that a correct colour planning for our domestic interiors could make a positive influence on people's moods. Therefore, by combining notions from different fields, it was possible to identify practical guidelines that were used to create two print collections for domestic interiors, six colour schemes and six material board proposals. Such guidelines and proposals could be used by clients and designers as reference to make informed decisions when decorating domestic interiors and designing interiors textiles.

Keywords: Seasonal Affective Disorder, colour psychology, colour theory, colour therapy, interior design, domestic interiors, light therapy, pattern design, textiles, colour.

TABLE OF CONTENT

Introduction

Research topic and rationale

“The singularity of colour is that imposes itself on the eye and the brain and the sense, and triggers off reactions which are both physiological and psychological in nature” (Danger, p. 54, 1987)

Seasonal Affective Disorder is a form of depression prevalent in between 1% and 10% of the population (Meesters & Gordijn, 2016). In Northern European areas, like Scandinavia, in six people one suffers from SAD (“Researchers confirm the biochemical cause of seasonal depression (SAD)”, 2014). SAD is a syndrome characterized by depressive episodes that appear in conjunction with any season.

My personal experience with the Finnish winter season, as a person who was born and lived most of her life in Italy, is the reason for this thesis topic. Everything started at the beginning of spring 2018, when all the trees and plants around the city of Helsinki bloomed and were covered with bright green leaves. Not only did days get longer quickly, bringing light and therefore the feeling of energy, but I also personally noticed that being surrounded by a flourishing and colourful nature had a positive effect on the mood and the desire to be active.
This came back to my attention at the end of the summer when I understood how much seasonal changing and winter in particular had been influencing my mood and especially my efficiency.
Concerning my living setting, I noticed that my attention during the summer had been towards the windows and outside, while later in autumn it moved towards the domestic interiors: this feeling was followed by the need to decorate more my home. During the literature review, I found confirmation of the importance of decorating the domestic interiors during winter in Danger’s words (1987).
This sparked the idea to add more colours inside the house in order to be prepared for the winter and the darkness, together with the decision to make this my research subject so that more people could benefit from it.

The American author and colour theory expert Birren (1961) supported the idea that colour and light are healthful factors for the human body and mind. For instance, they influence the metabolism and antibodies of humans.
If colours are a product of the visible spectrum of light and light is essential to human life, it is clear that the abundance of colours during winter could contribute improving the quality of life during the darkest times of the year; e.g. bright and warm colours are responded to positively while dim and cool colours are responded to negatively (Danger, 1987, p. 64).

Research gap

Common topics for academic textile design research usually include the development of individual creative process (Alanko, 2013), how textiles have developed in history (Tani, 2015) and functional textiles in which the functionality is in their woven structure and fibers and not in the colours, like acoustic properties (Haikonen, 2016). No other Aalto thesis has investigated the use of colours and prints in textile design for domestic interiors with therapeutic purposes.

Nevertheless, some research reports study the power of colour and its role in the design process. For example, Liikanen’s (2015) thesis analyses how different colourways can influence the final outcome of a textile collection. In a simi-

lar way, other works put the attention on the relation between us and the design products (in this case textiles) investigating our perception of garments and fabric (Alanko, 2013).

Other scientific researches about SAD that focuses on remedies mention the use of light and coloured light therapy (Oren et al., 1991; Strong et al., 2008); however, those and other studies do not concentrate on the possible benefits of colour and printed textiles in domestic interiors as alleviation tools for SAD symptoms.
Nevertheless, the richness of information about the way colour can positively influence humans and the way coloured light is already used as cure gives reason to believe that the thesis of this research and its objectives might bring useful results. In fact, the amount of literature studying the behaviour of colour in general and specifically indoor is copious together with all the studies about the colour phenomenon. Indeed, it appears to be a complex topic that requires a very wide knowledge in order to be handled.

Objectives:
Research questions

The questions of this research investigate whether not only the lack of light during winter, but also the lack of abundance of colours (typical of spring and summer) provoke winter SAD and winter depression in general, and therefore whether the introduction of more colours, and which ones, inside the house could help coping with winter SAD. Therefore, as previously anticipated, this research investigates the therapeutic use of colours in interiors and in prints for interior textiles as prevention and/or alleviation to winter SAD symptoms.

Main questions:
1) Does the scarcity of subtractive colours provoke fall and winter SAD?
2) How to develop and design a pattern collection for domestic interiors that will alleviate winter SAD symptoms?
Sub questions:
3) What is colour and therefore what is light?
4) Do subtractive colours have psychological and physical influence on humans? If yes, how to use colours with therapeutic purposes?
4) How to use colour and patterns in the domestic environment?

Research purpose

Based on colour theory, colour therapy, colour psychology and the literature discussing the use of colour in domestic interiors, this study attempts to find practical guidelines for the use of colours (meaning subtractive colour and not additive colour that is coloured light) in printed textiles and for colour planning for home interiors with the aim to prevent and/or reduce the symptoms of winter SAD. From now on the acronym SAD will be used to refer to fall and winter SAD.

These guidelines could be used to make informed decisions by interior designers, print designers, textile designer and by customers when styling home interiors and colour planning their homes with the aim of creating an energetic or relaxing atmosphere. At this point it is useful to clarify that in interiors we can mix both subtractive colours (pigments) and additive colour (light), however this research will study the best way to use colour as pigments.
More specifically, this research is oriented to propose a design solution to an audience living in Scandinavian countries (for the purpose of this research the term Scandinavia will include also Finland).

The design outcome of this study will consist of two coordinated collections of prints for home interiors (living room and bedroom), based on those same guidelines together with three colour and material planning proposals for both the rooms.
The prints will communicate and imply something more than their evident connotation, as they must represent and communicate the purpose of the whole project. The patterns and colours themselves will transmit power and energy or

tranquillity and relaxation according to the area of the house they are addressed to. Eventually, this will be made by transposing the colours, light and elements from the summer and summer nature inside the home.

The reason why this research will focus on the way to create a relaxing environment as well as an exciting one is that because, as will be explained in Chapter 1, guaranteeing a good sleep-wake rhythm and therefore a relaxing environment for the bedroom during the dark season is as important as finding ways to energise people during the day, for example, by using specific textiles for the living room.

The solutions studied in this thesis project, considering colour as well as light a good way to take care of SAD symptoms, might not be as powerful as daily light therapy session with 2500 lx. Nevertheless, this study wants to demonstrate that the use of colour in home styling during fall and winter can be one of the complementary ways to help cope with SAD.

Methodology and methods

As suggested by Muratovski (2016), the choice of methods to gather data needs to be based on the nature of the research questions. In this case, the two main research questions investigate an alternative solution to a psychological condition during winter through the use of colours. In other words, it studies the phenomenon of colour and light and SAD syndrome (e.i. some of the ways humans experience life and the world), with the aim to predict the way humans could react to colour stimulation and which hues and colour scheme could have a positive effect on us.
Hence, in order to start a literature review, this study clarified the information it needed in order to answer the research questions and, therefore, define a design solution to the SAD syndrome symptoms. Needed information was collected using both qualitative and quantitative research methods.
A qualitative research approach was the fitting one for these research questions since it exactly studies the ways people experience the world and helps to discover the deeper meaning of specific problems (Muratovski, 2016). By choosing the case study approach, questions like how and why were answered with qualitative methods like the collection of information from different sources as books and scientific articles (Muratovski, 2016).

The first main research question and the three sub questions were answered with a meeting with an expert in Health and Wellbeing Architecture and with research about the influence of colour (and therefore light) on the human mind and body, the use of colours in domestic interiors, SAD syndrome, common cures for SAD nowadays and similar theories to mine that concentrate on the use of colour as a cure.
Similar information (about energetic and calming colour, home-styling habits and SAD cures) were subsequently collected with a survey, a very common form of quantitative research, that became advantageous as less time consuming than interviews (a qualitative method), considering that it was possible to reach a larger number of people, who were free to answer to the survey when they had the possibility, taking the time they needed. The survey was shared via email with a group of 20 people from: Finland (12), Italy (5), Taiwan (1), Corea (2). The age span was between 24 and 59, 3 were men and 17 were women, 17 living in Finland and 3 living in Italy.

Furthermore, the second main research question was answered with the creation of two pattern collections, six colour schemes and six material proposals aimed to alleviate SAD symptomes. Thanks to the previous research the design solution proposal was developed through informed design decisions.

Summary

This first part aimed to introduce the reader to the topic of this research book: fall and winter Seasonal Affective Disorder and how to prevent and/or alleviate its symptoms through conscious decisions about home decorations and home colour planning. It also explained the validity of this topic and the methods and methodologies that have been used to collect the information needed to design a solution for this issue.

Chapter 1

Introduction

In order to answer the first research question (main question 1) and propose a solution to the problem (main question 2), the work first analyzes the phenomenon of light and colour (sub question 3). Second, it reviews information regarding the influence of colours on the human mind and body (sub question 4). Third, it collects data about the way to use colours in domestic interiors (sub question 5). Fourth, it focuses on SAD syndrome, especially on the existing cures, in order to understand the illness before designing a solution for it.

1. Literature review

1.1 The phenomenon of light and colour

1.1.1 Light from the experiential point of view:

Light is what we need to see objects, the space and any surface (Arnkil, Fridel & Klarén, 2012).

1.1.2 Light from the physical point of view:

Light is electromagnetic radiation and can be represented as a shower of photons (that are packages full of energy) measurable in Joule (J) unit or kilowatt-hour (kWh) unit. Otherwise light can be represented as waves with different wavelengths measured in nanometres (nm) unit. Most commonly when we talk about light, we refer to the light which is visible to the naked eye. This is limited in the span between 380 and 780 nm defined as the visible spectrum. Vision is a neural process and it is activated when receptors in the human eye are stimulated by wavelengths between 380 and 780 nm. In contrast, the invisible parts of light are the ultraviolet radiations which have shorter wavelengths than the visible spectrum and infrared that have longer wavelengths than the visible spectrum. Wavelengths like radio waves which are longer than infrared and waves like gamma- and X-rays which are shorter than ultraviolet are included in the electromagnetic spectrum even if they are rarely referred to as light (Arnkil et al., 2012).

1.1.3 Colour from the experiential point of view:

If light is what allows us to see, Hård et al. (1996) explain that colour is what allows us to distinguish things from each other through their colour contrasts (as cited in Arnkil et al., 2012).

1.1.4 Colour from the physical point of view:

Electromagnetic radiation, whose wavelength is between the interval considered as the visible light (380-780 nm), can be separated into many wavelengths with a prism as shown in Figure 1. Therefore, we can perceive the different hues. The same phenomenon happens in the rainbow where water drops act as prism. If we put together those hues, we can visualize the spectrum that usually goes from blue being the hues with the shorter wavelength, to red which has the longest wavelength. The electromagnetic radiation in this spectrum having a very short band is called monochromatic. However, it is not possible to define a universal connection between the perceived hues and wavelengths because “The perceived hue depends on local contrasts and the total viewing situation and also the intensity of the radiation” (Arnkil et al., 2012, p. 54). The spectrometer can detect the spectral distribution curve which is the illustration of various wavelengths in different proportions. This consists of “the radiation reflected or emitted by an object” (Arnkil et al., 2012, p. 55). Therefore, the darker the colour (for instance black), the less light is reflected vs the brighter the color (for instance white) the more light is reflected. Such situation occurs when light is projected towards pigments (called subtractive colours because they absorb the part of the radiations we do not see). Whereas, the total sum of different colour pigments will give as result colour black, in additive colours (that are coloured lights) the total sum of each colour will give as result the colour white (Arnkil, Kakkonen & Aalto-yliopiston taiden ja suunnittelun korkeakoulu, 2007/2013).

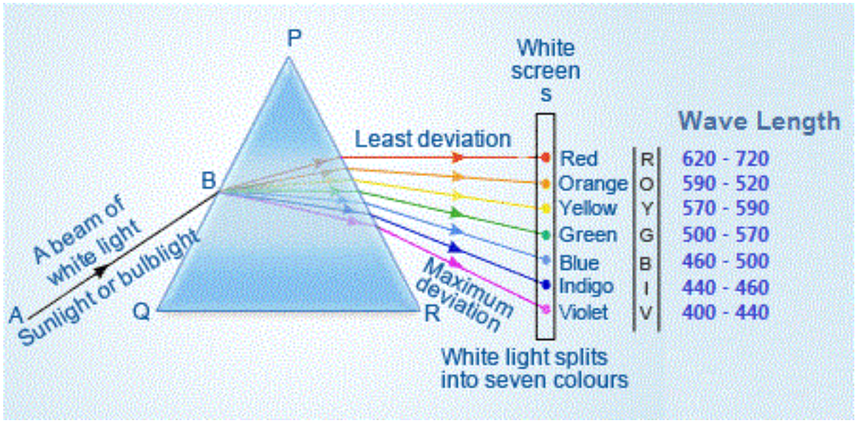


Fig. 1 The picture shows he way the white light is divided into the colours of the spectrum through a prism.

1.2 Colour and humans

> Colour helps to take a man’s mind off what ails him. Balanced light helps to keep an individual in good physical shape, and colour helps to keep the individual in good emotional shape. Blandness and bleakness are psychologically intolerable, and the resourceful use of colour will ensure emotional and mental balance. (Danger, 1987, p. 64)

In section 1.2 the phenomenon of colour was explained in its physical aspects and briefly in the way we experience it. On the contrary, in this section, it will be considered also as a psychic-spiritual experience of who sees colour: colour is more than an optic phenomenon, it also holds psychic and symbolic meaning. Itten (1961/2007) explains this aspect of colour by listing all the different points of view used to study the problem of colour. For example, a physicist studies the energy of electromagnetic vibration; a physiologist investigates the effects of light and colour on the eyes and brain, while the psychologist analyzes colour radiation effects on psyche and mood. Eventually the painter must study the physiological and psychological aspects in order to be able to use colour correctly from the aesthetic point of view. In other words, he must know the effect of colour on the eyes, brain and mind as a whole. Similarly Wright (2012) explains that defining the psychological qualities of each hue means blending physics, neuroscience, physiology, biochemistry etc. and the role of psychology is to define the way to interpret those reactions.

Another aspect of colour that needs to be addressed is its volatile nature. The Dutch designer Hella Jongerius (2016) at the start of the book (the description of the creation of the colour and material library for Vitra company) wants to clarify and remind the reader that colour is something that is always mutating. This happens because of the variation of daylight and because of the process through which our eyes perceive colour: it is something very subjective and unique. An important factor to consider, in order to understand how important the choice of a colour is, is the act of connecting colours to feelings and memories from our life (Jongerius & Masse, 2016).

The perception of colour changes during day time and according to different places and illumination levels. These variations perceived in colour can happen because of contrast, light and reflection. For instance, there is reflection between the colours present in a room: they influence each other even if they are not physically next to each other (Arnkil et al., 2007/2013).
The way we perceive a colour and its temperature depends on the characteristics of the surrounding: for example, other colours and lighting. (Eiseman & Herbert, 1990).
Generally, the effect of colour can be influenced and change if other senses are stimulated at the same time. These could be smell, heat or cold, noise as well as shape, surface, harmony and proportion can influence the effects (Birren, 1961).
At the same time, we must always remember that human emotions are influenced by many different factors related to the environment (external stimuli) or related to introspection (internal stimuli). Therefore colour and light are only some of the factors that influence a person’s mood (Arnkil et al., 2007/2013).

1.2.1 Disciplines that study the relation between colours and humans

1.2.1.1 Colour psychology

Colour psychology is “a diffuse area of knowledge and research concerning the psychological and physiological effects of colour” (Arnkil et al., 2007/2013, p. 279). In their book “Colour in the visual world”, Arnkil et al. (2007/2013) explain their methodology where physical and psychological responses are studied. Some of the methods are, for instance, exposing people to a colour and calculating their cardiovascular and endocrine data or the electrical activity of the brain. Furthermore, psychological tests and interview methods study psychological factors, such as the emotional response to colour. E.g. they investigate whether the perception of time can be influenced by specific hues.

1.2.1.2 Chromotherapy

Chromotherapy is an alternative therapy method that uses colours. Colour can be considered as the individual wavelength of the electromagnetic radiation commonly called light or as a result of the contact between matter and light (Azeemi & Raza, 2005).
Chromotherapy considers the body as a composition of colours; therefore, each part of the body is assigned a colour. Every part of our body possesses energy vibrating to a precise frequency in harmony with the vibrations of these colours. The disease or malfunction of one or more parts of our body might be in connection with the variation of those vibrations.
Chromotherapy can be applied in different ways, for instance, by exposing the skin or the eyes to the energy and radiation of colours, in other words, by feeding colour to the body. Historically during the evolution of chromotherapy, many researchers studied which colour was needed to cure different parts of the body and different diseases. For instance, the physician Edwin Babbitt, who lived between the 19th and 20th Century, created his system of colour and body diseases (as cited in Azeemi & Raza, 2005). For example, red was prescribed for rheumatism, yellow as laxative and blue for inflammatory conditions. Later on, Ghadiali (1927), defined the specific areas of the body and the most effective colours to cure each of them. According to Klotsche, these areas are similar to chakras (see Picture 2) which are areas of the body with high concentration of energy (as cited in Azeemi & Raza, 2005).
During the second half of the 20th Century, further studies discovered and proved the efficiency of white and coloured light on mental and physical illnesses. For instance, blue light started to be used to cure neonatal jaundice, and white full-spectrum light was found effective in treating diseases like SAD, anorexia and alcohol addiction (ibid.). (Azeemi & Raza, 2005).

Birren (1961) summarizes the most common colour ailment prescriptions used by chromopaths at that time. For example, blue was prescribed for different forms of neurosis (such as epilepsy, paralysis and convulsion) and to soothe inflammatory conditions in general. In order to cure respiratory organs, the exposure of different parts of the body to blue and/or yellow is suggested in different combinations according to the disease. Violet and blue hues are often recommended for skin diseases. For cancer, blue is suggested to be used for the pain while green, violet and ruby in alternation as generic cures.

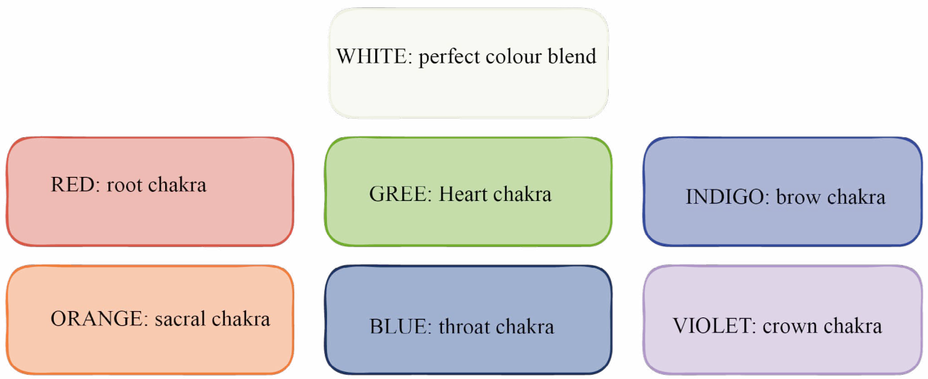


Fig. 2 Connection between chakras and colours according to Klotsche.

1.2.2 Colour preferences and the influence of colour on human beings

Colour preference is a complex phenomenon that has been exponentially changing and developing. Hurlbert & Ling (2012) further investigate this phenomenon from a different point of view, analyzing its development during the centuries.
Their research questions (why we see colour and why colours are so strictly connected to feelings) provide food for thought; however, I will further discuss the most relevant information for the purpose of this research.

Nowadays, little is known about the elements that influence colour preferences despite the extensive studies surrounding this topic.
On the other hand, it has been clarified that colour preferences probably originally provene from preferences for an object with qualities that we needed or liked as explained by Hurlbert and Ling (2012) in the conclusions of the chapter about colour preferences.
Furthermore, the attraction to blues and red and aversion for yellow-green and yellow can be defined as universal even though it has been recognized that eventually colour preferences are individual and that they change during our life as consequences of our personal experience. Pause on the colour preferences phenomenon was needed in preparation to a concept that will often recur in this text: “colour is healthful when is liked”.

The psychoanalyst and physician Deutsch (1937) confirms the fact that light as energy can influence the body through the eye and therefore the brain, but it can also cause biological effects to the rest of the body (as quoted in Birren,1961). Deutsch differentiates between physical light influence and emotional light impression. He also believes that colours will be more helpful when followed by personal preferences. For instance, when people are exposed to a hue they appreciate, their whole system will calm down and their mindset will become more positive.
The unique colour combinations that every individual considers “harmonic” are defined by Itten (1961/2007) as subjective colours which represent the subjective chromatic sensibility. Therefore, whenever people are exposed to colours that are far from their subjective colours, they might experience a negative psychological effect (Itten, 1961/2007). In addition, Danger (1987) affirms that when the use of colour is related to the decoration of domestic interiors, it should meet the desires and ideas of that single person instead of following generic principles. Unfortunately, reactions to hues are attenuated and it is not possible to predict them since they respect no rule or pattern (Deutsch as quoted in Birren,1961). However, it can be useful to consider that artists and designers have extensively been using the colours from nature as inspiration. Likewise, most people usually find harmony in natural colours (Arnkil et al.,2007/ 2013).

On the contrary, Best (2012) in her book “Colour Design” reports the distinctive “Wright theory” in the chapter about the prediction of responses to colours. According to A. Wright, it is possible to predict the reactions of people to colour schemes (and not single colours) by considering personality types. Therefore, she supports the idea that people can be divided into four personality types, each one having a stronger connection with one of these four colour groups: morninglight (for personality type 1), dreamlight (personality type 2), firelight (personality type 3), starlight (personality type 4). These personality types will influence the response to each colour scheme; while every colour and its shades are part of one of those four colour schemes. Each colour, referred to as a psychological primary colour (red, blue, yellow or green), will influence different psychological modes whose effects are universal. This theory is based on the belief that the electromagnetic energy of colour is strong and it influences our psychology more than we realize. In fact, electromagnetic radiations that have shorter (x-rays) or longer (microwaves) wavelength than visible light still affect the human body.

The four psychological primary colours and their effects according to A. Wright:

- Red – affects us physically, affecting what might be termed ‘lower order’ psychological activity.
- Blue – affects the intellect, promoting thought and ‘higher order’ activity.
- Yellow – affects the emotions, the ego and self-confidence.
- Green – affects the essential balance between mind, body and emotions – a more important consideration than is often realised.

(Wright, 2012, chap. 6.3.1)

The remaining colours in the spectrum and their effects according to A. Wright:

- Orange –a mixture of red and yellow, therefore combining physical with emotional reaction – activates awareness of secondary survival issues of food, warmth, shelter and sensuality.
- Indigo – a mixture of blue and violet, and invariably a dark colour – evokes deep contemplation and thought.
- Violet – a mixture of red and blue, physical and mental – evokes introspection and appears to take awareness to a higher plane of thought, stimulating imagination and consideration of wider philosophical ideas; it can be described as the colour of the ‘spirit’.

(Wright, 2012, chap. 6.3.1)

In this dissertation the topic of colour influencing human life has been analyzed by collecting information from different sources, some of which have been just reported. Eventually, this subject will be addressed following the point of view of Arnkil et al. (2007/2013) who focus on the associative potential of colour and consider colour as one element of the whole.

Arnkil et al. (2007/2013, p. 250) recognize that colours are the protagonists in the process of creating specific emotions and atmospheres in visual communication and art. The ability to combine colour and material is very important in order to obtain the desired effect. However, they question whether colours have the capacity to influence us when isolated or whether their efficacy is valid only because of their relation with materials and environment. More often, the associative ability of colours is not considered enough.
Another aspect of colour, which makes it a hard subject to define, is the fact that its effects on the human mind and body are difficult to discern (ibid.).

Furthermore, Chromotherapy, as discussed by Azeemi & Raza (2005), believes that colour can be used as a therapy to improve our physical and mental wellbeing: colours have the power to influence the human body because they are considered as light in their nature and therefore energy in the form of radiation.
Nevertheless, as Arnkil et al. (2007/2013, pp. 250-251) claim, whatever the physical effects of colour, it still might not be because it is releasing any specific light frequencies. The influencing power of colour might reside in their relationship with other elements since colour is always in relation with something else: material, environment, etc. and eventually the viewer's eyes. Colour is always perceived through the eyes of the viewer and each of us will always experience it in a subjective way depending on our unique physiology and our experience of life. Furthermore, we must recognize that the effects of coloured surface are not the same as coloured light (ibid.).
In fact, the colour temperature of light has different effects on humans while colour temperature of surfaces has effects that are milder and harder to define (ibid.).

At the same time, Arnkil et al. (2007/2013, pp. 251-254) does question whether a specific frequency range of light, as for example is colour, could influence the body in some way. Nevertheless, no precise answer to this question has been found. Some of the evidence focused on all the light of the spectrum but not to a specific wavelength.

To find an answer to this query Arnkil et al. (2007/2013) analyze some of the most common ideas about the influence of colour on mind and body: 1. Blue and green relax the metabolic activity while red excites it. 2. Red makes the environment feel warmer than it is while blue has the opposite effect. 3. Colour can influence the perception of time passing: with red time goes slower while blue makes time go faster.
About claim 1. it has been shown that strong contrast and vivid red with orange cause no raise of blood pressure but only a raise in nervous activity (Küller et al., 2009, as cited in Arnkil et al., 2007/2013).
For claim 2. no decisive proof has been found because the connection between blue and green with freshness and red and orange with warmth was found to be a very common feeling. However, these mental associations did not change the way the temperature of the environment was perceived (ibid.).
For claim 3. no conclusive proof has been obtained.
Later on Küller et al. (2009, as cited in Arnkil et al., 2007/2013) made new experiments. For the first time, the results considered the mood and personality of the participants and demonstrated that it is possible to bring the brain to an excited state with patterns and strong colours (like red) and that, as an unexpected reaction, the over-exposure to an environment rich in prints and colour could cause the heartbeat to slow down. Subsequently, Küller et al. (2009) found out that it was unlikely to define precise guidelines for the best colour planning in communal areas (like offices).
Categorizing the psychological effects of colour is a difficult task because, as noticed by Mikellides and other researchers (as cited in Arnkil et al. 2007/20013), even colour saturation can influence. Less saturated colours were found to be more calming than strongly saturated ones.
Nonetheless, on the basis of these results, Küller (as cited in Arnkil et al., 2007/2013) suggested that a balanced colour planning can improve people's feelings and the body as a whole.

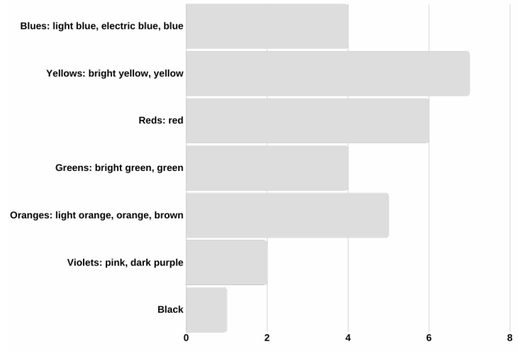


Fig. 3 Energizing colours: answers from the survey.

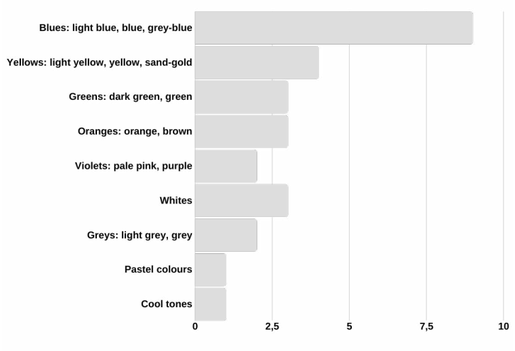


Fig. 4 Relaxing colours: answers from the survey.

1.2.3 Associations with colours and the concept of energizing and relaxing: survey results

A questionnaire has been drafted and proposed via mail to 20 participants in order to collect direct information. They were asked to express their personal associations between energizing (see Figure 3) and relaxing (see Figure 4) concepts with colours.
In the survey, the answer to this question was made with open text and not with a list of colours that people could select. This was decided with the aim to allow participants to write the colours' name and their specific characteristics (like, for instance, brightness). Infact, colours have infinite different shades and each of us has unique preferences, therefore, it would have been incorrect to force people to choose between preselected hues and not being able to express their thoughts more freely. On the other hand, whereas somebody answered typing the precise name of a color shade, not all the answers have specifications about the colour. For instance, "blue" as answer could refer to"dark blue" as well as "bright blue" and we would not know because we do not know what the participant meant when they answered. Such condition made it more difficult to summarize the results. Eventually, the different answers were collected into small groups according to the colour family they belong to. Each of the primary and secondary colours was used as colour family together with black, grey and white. Some of the answers were not included in any of the families because they were too generic or because they included too many colour families. However, they were introduced within the infographics for informative purposes.

The results show that yellows are the colours most linked to energizing concept. On the other hand, blues are the ones more highly connected to relaxing concept. Whereas it was not a surprise to find reds in the energizing group and blues in the relaxing group, the presence of yellow in both concepts was unexpected. Therefore, it could be possible to imply that yellows, as the hues that reflect more light compared to reds, blues and greens, are the ones that were more deeply impressed in some of the participants minds.

1.3 Colour and patterns in the domestic environment

Colour Theory

Colour theory studies the guidelines of chromatic effects and the way they appear to us (Itten, 1961/2007).

1.3.1 Colour behaviour in the domestic interiors

Despite the lack of scientific proof, interior designers have started using some efficient rules for colour organisation. Some of the most interesting and useful ones are introduced in chapter 1.4.
When inquiring about interior design and colour organization, the most interesting notions regard the ways in which to create visual effects expressing positive feelings. For example, in order to reduce the feeling of being in a cube when working with a square room, it is suggested to paint one of the three walls with a deeper colour than the others (Eiseman & Herbert, 1990, p. 24).
On the other hand, it seems that decorating one wall with a deep hue colored wall paper could work equally well as using deep-colored curtains or furniture alongside one of the four walls.
In fact, intense colours in a big proportion can be disturbing. However, if used in small quantities, like in the entry of a house or in a small room in which people spend little time during the day, they can be energizing (Eiseman & Herbert, 1990, p. 24). In addition, a method to make a hallway look optically longer is to paint the walls with deep hues, and possibly having the floor, ceiling and door frames of the same light colour. In the occasion of the corridor leading to a bigger room, the final effect will resemble a tunnel leading to light (Eiseman & Herbert, 1990, p, 24).

In general, it is always important to remember that fresh and bright colours enlarge spaces, while warm and dark colours give the effect of reducing the space: a colour will always be influenced and influence the other colour next to it (Eiseman & Herbert, 1990). These researchers further suggest warm hues for areas facing north in houses located, in this example, in the Northern Hemisphere.

1.3.2 Colour planning: an introduction to the process of colour design for interiors

Other practical and handy advice instructs about combining the colours within both the room environment and pattern composition. Eiseman & Herbert in their book “The PANTONE book of colour” (1990) group many practical and essential guidelines. First of all, when working with more than one colour, it is fundamental to choose the dominant one (that means, which one will be present in the biggest quantity while giving a specific psychological impact), the subordinated ones and the accent colours. Additionally, when working with only two colours, it is better to use one in a bigger percentage than the other in order to guarantee a colour balance. In this case, colour asymmetry is better than colour symmetry.
The same guidelines can work within patterns (Eiseman & Herbert, 1990, p. 23). Furthermore, in interior design in general “every color should be repeated at least once for greater balance” (Danger, 1987, p. 25). Nevertheless, according to Eiseman and Herbert (1990), working with more than three hues can be difficult, especially for non-experts.

1.3.2.1 Colour planning

Before starting colour planning there are few basic notions which are useful to get familiar with:

Colour harmony
When it comes to colour harmony, it is important to consider what happens with our eyes and brain. In fact, if exposed to colour, our eyes look for an empty space in which to reproduce the complementary colour in an attempt to create balance. The eye is always looking for the “totality”. For example, when someone is first looking at a red square and later closes their eyes, they will see a green one. In order to verfy yourself, you can try and watch the redsquare in the top of the next page for few seconds and then watch somewhere else, possibly an empty white surface. You will notice that a green square will seem to appear.
By summing these two complementary colours, they obtain dark grey from the optical point of view (Itten, 2007). Therefore, combining complementary colours and using empty spaces would help obtaining colour harmony.
Human eyes look for balance in a similar way when they are exposed to an environment characterized by warm colours; in fact, they appreciate the presence of some spots of a cool colour. Similarly, in an interior that appears too cool, a spot of yellow, like a painting or a piece of furniture, can donate the right touch of warmth (Eiseman & Herbert, 1990).

Colour and space
A - space influences the way we

experience colour.
B - colour influences how we see and are in a space, as previously said it can change the perception of distance and volumes.
C - coloured spaces influence our emotions (Arnkil et al., 2007/2013).

Client personality
When colour planning for the home interiors for clients or even for our own home, it is important to remember and respect the personality of the people who will live in that space (Haller, 2012).

There are many ways an interior designer can find inspiration to start a colour scheme for a space. One option is to start from one object liked by the people who will live in that house, it would be something that fascinates them. This object can be used to define the colour scheme by using the same colour proportions or exact same colours but in opposite proportions or by choosing only three colours from which one will be the dominant and one will be the accent colour. Nevertheless, it is essential to respect the personality of the clients who will live in that space and use it as one of the criteria to create the colour scheme (Haller, 2012).

Successively, five main factors can be considered together with the client’s personality: the character of the room, the function, the people using it, direction and size of the space (Danger, 1987).
The first factor to consider is the character of the room, for example, exciting, restful, intimate, bright, or cool. Some cases being: bright light and colour will create a cheerful ambient and stimulating effect; soft colours are good for relax; low light and dark ambient can be depressing; pale colour and low light suggest passive attitude; dark and rich deep colours create an intimate room; colour close to each other on the colour wheel (which makes them harmonious) will create a calming effect; background in strong contrast with the rest of the environment can be exciting; many colours will create a cozy room; when carpet and draperies contrast with the walls it is possible to obtain a lively effect; too many colours in little space will create agitation; conclusively, we must remember that lights can change the character of the room at the same time (Danger, 1987, p. 188).

Secondly, the function of the room will further influence colour choices.
For instance, if the function of the living room is to be recreative, both bright and calm colours can be used. In case the living room is a place for working, it should not be decorated with colours and surfaces that differ a lot in brightness in order to avoid eye strain (Danger, 1987). Eye strain happens because the eye’s muscles become tired when there are surfaces with big difference in colour brightness in the line of vision. In fact, the eye has to continuously adjust to the different darkness or brightness (Danger, 1987).
According to Arnkil et al. (2007/2013) more saturated colours are good for the living room as they are stimulating the brain. Therefore, low saturation colours are better for the bedroom.
When decorating a hall, it is usually better to act audaciously when choosing the colours, bright strong colour can bring life to this place. The hall is the part more seen by guests, and it is the part that leads to all others areas of the house, so it should symbolically lead to these through the use of colour. For example, the colours present in the various rooms of the house should be reproduced in the hallway. It is useful that the first impression when entering a house shall be warm and joyful. Therefore, neutral or pastel colours are not great choices for these areas (Danger, 1987, p. 196).
For bedrooms, in order to create a relaxing atmosphere, soft and pastel colours should be used. In this case, Danger (1987) advises to avoid lively and disturbing colours. Colour can also be used in order to prevent eye strain by limiting brilliance (Danger, 1987).

Subsequently, another factor that influences the choices of colours for a room are the people who will use it. In fact, as previously anticipated, before we start colour planning we should always be aware of the people who will be living in that house or room and their personalities. For example, designing interiors or colour schemes for a room that will be used by people with mental health issues requires deeper consideration (L. Arpiainen, personal communication, September 16, 2019). The final user factor is also important if children are involved, since they are attracted to bright and primary colours. For instance, it can be helpful to decorate a room where we want to store frangible objects with light colours and delicate fabrics, this way children will be less attracted to that place (Danger, 1987).

Therefore, we must consider if the room is facing north, east, south or west together with other climate factors like hemisphere. Rooms full of light can be decorated with any colour, whilst rooms poor in sunlight will need more light colours (Danger, 1987). Therefore, because of the blue quality of light in the Northern Hemisphere and the long and dark win-

ters in Scandinavia (Haller, 2012), a living room in a house here will need, as similarly suggested by Danger (1987) for British houses, warm colours like “firework” hues in small quantities, neutral colours with brilliant accents and light colours, especially yellow, regardless of its direction in the compass (Ibid.).

Lastly, the size of the room will require different kinds of colour, decor and furnishings. For example, big-scale patterns are good for big rooms, as well as fuzzy patterns and warm and strong colours, whilst small rooms ask for small patterns and bright coloured walls. To increase room size, it is also suggested to use as few colours as possible. Wall paper with a diagonal pattern will give the illusion of a larger room.
On the other hand, large living rooms possess the risk to transmit a cold atmosphere; to avoid that, it is suggested to create contrasts with different colours. It is fundamental to always try to create harmony with the chosen colours (Danger, 1987). Ceilings can help reflecting the light if colored with bright hues (Danger, 1987, p. 193), similarly mirrors will influence the colours in the room and create a bright environment by reflecting light. Mirrors could also be used to cover an entire wall, but, in order to ensure a restful environment, the other hues present in the room should be soft. Neutral colour for the flooring is a good way to create a calming setting (Ibid.).

For the colour planning of a room it is also possible to follow more detailed suggestions through schemes (Danger, 1987).

Complementary scheme: at first, one colour is chosen and then some areas are coloured with its complementary colour. This is a helpful solution for those who find hard to choose colours for their home.

Related scheme: using two colours that are close to each other when considering the colour circle, it is a way to be sure that the final effect will be enjoyable/ attractive.

Monochromatic scheme: one colour and many tone variations of it. In this scheme patterns and textures are important. It is possible to juxtapose accent colours (little quantities of contrasting hues) to the one colour and its variations. This is also a good choice because you can modify the room without having to change everything. For example, you would only have to change as little as the accent colours. Therefore it is a good solution for people who like to rapidly alter their living space from one season to the other.

However, when re-decorating a room, it is generally suggested to use one colour (a trend colour or a favourite colour) as starting point. A trick is to select one of the colours of the curtain (when it has a pattern) and use that as the main colour, while using the other hues of the pattern to build the scheme. It is also recommended to prefer intense pastels to pure hues and to use a neutral colour to bring together a colour scheme (Danger, 1987).

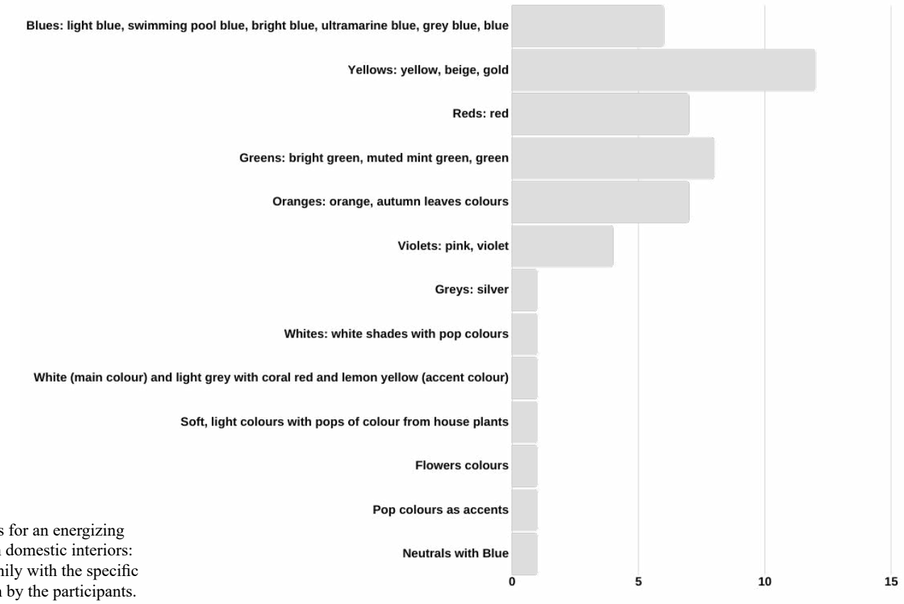


Fig. 5 Colours for an energizing atmosphere in domestic interiors: the colour family with the specific answers given by the participants.

“Grey, beiges and other soft tones make a serene, complementary background for more diverse materials and colors, whether in a slick contemporary apartment or a tropical retreat” (Richardson & Powers, p. 246, 2010) .

“In art and crafts, fashion or interior design, every color should be repeated at least once for greater balance” (Eiseman & Herbert, 1990, p. 25).

1.3.3 Energizing and calming colours in the domestic interiors: survey results

In the survey it was asked to the participants to specify which colours they would use or already use to create an energizing or relaxing atmosphere in their homes. Answers can be seen in Figures 5 and 6.
As previously explained in chapter 1.2.3, the answers were open to allow participants to express their thoughts and these were grouped according to colour families.
The diagrams representing the results show that, for these questions, the participants answered with more specific colour names or colour combinations. For the energizing environment, yellows are the most present hue followed, in order of relevance, by greens at the second place and reds together with oranges at the third place. For the relaxing environment, blues, greens and yellows are all together in the first place (in this case yellows represent darker shades than in the other answers), followed by whites at the second and oranges at the third place. It is surprising the fact that violets received little consideration; it is interesting to see the importance of soft colours and neutrals in combination with other hues given by the participants.

1.3.4 Patterns in the domestic interiors

Regarding the literature about the use of colours and patterns in home interiors it becomes clear that designers must be careful when planning and designing their collections. In truth, it is hard to generalise when talking about patterns, and personal taste also plays a very important role when choosing them.

The colour research consultant Danger (1987) discusses how it is not just colours that give a precise character to a room while creating a specific atmosphere (e.g. relaxing). In fact, patterns of different scales, according to where and how they are used, can make a positive difference in people’s moods. For instance, walls decorated with patterns in lively colours can be excellent for one’s state of mind. However, if the patterns are for a living room or a room where people usually spend a lot of time during the day they should not be too eccentric and bold because that is an area where people usually spend a lot of time (Ibid.).

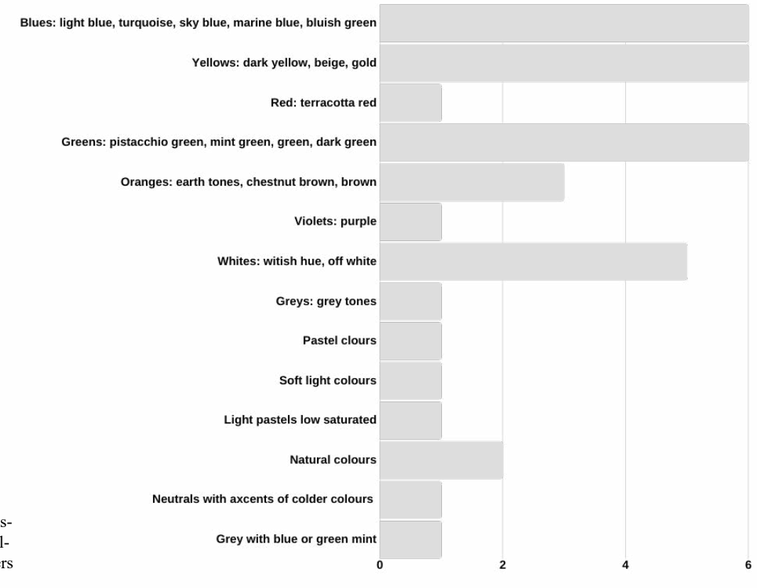


Fig. 6 Colours for a relaxing atmosphere in domestic interiors: the colour family with the specific answers given by the participants.

Furthermore, an important factor that influences the choices of patterns for a room together with the final use are, again, the people who will use it. For example, designing patterns for a room that will be used by people with defective sight (like elderly people) or other conditions affecting their perception of the surroundings requires more attention. As Arpiainen (personal communication, September 16, 2019) explains, patterns can be misinterpreted and people can be confused by them. For instance, for old people who have poor vision, big stripes on the floor can look as if underneath there were a hole (Ibid.).

Patterns can vary in size, design and colour, and when combining different prints or colours, it is essential to consider all of these aspects (Danger, 1987). When prints do not look alike but there are elements of the same collection or they are used in the furnishing of the same room, they can be linked by using the same hues in order to create cohesion (Eiseman & Herbert, 1990, p. 23). Similarly, Danger (1987) explains how connection between a main pattern and the rest of the room can be created by adopting the predominant colour of the pattern elsewhere in the room. For example, in one room, the main bold pattern could be used for the wallpaper or floor covering. This is why patterns are usually designed as part of a coordinated collection: they will be inspired by the same theme, colored with hues that are part of the same colour chart and designed to be used together.

"Different colours will blend so long as there is a link between them, and once started, more patterns can be added without destroying the scheme" (Danger, 1987, p. 197).

Birren (1961) exemplifies the way colours and patterns can make the difference, for instance in the bedroom area. According to him, whereas late sleepers could be invited to go to sleep earlier by simple areas and delicate tones, early rising could be supported by big scale patterns and high contrast. Moreover, if large patterns with contrasting colours are energetic for the mood, bright and light colours will have similar effects (Danger, 1987). In general, bold patterns will dominate a room.
Large-scale and bold patterns can create a warm environment. However, the use of many patterns will give an informal look to the space and make the room look smaller. In contrast, patterns used on a light background can make a room look bigger.
If the flooring is decorated with a small-scale pattern, it will work well in combination with large patterned fabric and vice versa (Danger, 1987). Next to wooden surfaces, simple fabrics and stripes work well. Small designs are good with wide furnishing, and big designs works better with plain furniture. Small-scale patterns can blur, however, when seen on a wide surface (Ibid.). Fine designs are good for areas that are used often while it is better not to have too many different patterns from one room to the other (Ibid.).
Patterns can be a distraction, compared to solid colors. This could be advantageous, if the patterns are meant to relax the mind while distracting it from everyday problems (Birren, 1961). Similarly, the Austrian architect and designer Joseph Frank believed that a rich an adorned surface could have calming effects because its numerous details would take the attention of the viewer forcing them to slow down and take time to observe it (Josef Frank, n.d.).

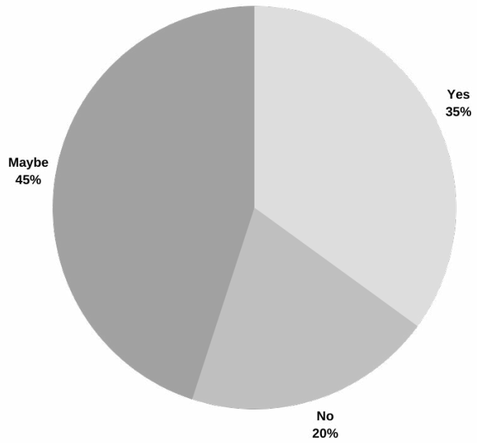


Fig. 7 The chart shows what participants answered when they were asked to say whether they think they suffer from SAD or not.

1.4 Seasonal Affective Disorder

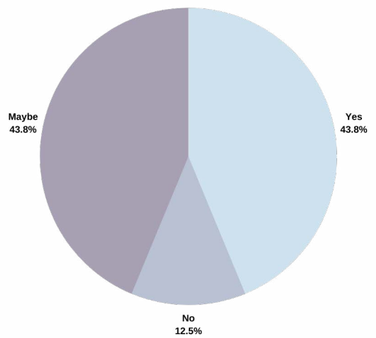
> The impact of light on our mood and emotions is well illustrated in a recent cross-cultural study involving 1000 people in Sweden, England, Saudi Arabia and Argentina (Küller et al., 2006). The results show that both England (52 °N) and Sweden (56 °N) exhibited serious symptoms of seasonal affective disorder, commonly known as SAD, during the winter, compared to Argentina (27 °S) and Saudi Arabia (26 °S). These symptoms indicated extreme tiredness, insomnia, lack of concentration, inactivity, social withdrawal and poor mood. Almost half of the population of the two northern countries exhibited some degree of seasonal disorder (as cited in Mikellides, 2012, chap. 4).

As mentioned in the Introduction, Seasonal Affective Disorder (SAD) is a syndrome characterized by depressive episodes that appear in conjunction with any season. Figure 10 illustrates the most common symptoms.
This research will concentrate on winter SAD and, from now on, SAD will be used to refer to both winter SAD and its milder versions. One of the main reasons differentiating this illness from major depression is that light can be used as a cure for people suffering from SAD. Another distinction must be done between SAD and Winter Blues/Subsyndromal SAD (SAD milder versions). It appears that SAD has a bigger impact on the subject's life, and the severity of the manifestation is higher. Nevertheless, they both respond to the same cure (Simpson & Simpson, 1999).
Furthermore, it is important to know that a subject of any age can suffer from SAD or SUB SAD, even toddlers. However, in this specific case, the symptoms will be more delicate and less distinct than in adults (Simpson & Simpson, 1999.)
"Self-administration of a SAD diagnostic test, a modified Seasonal Pattern Assessment Questionnaire, by 1,835 students aged nine to 19, identified SAD in 2.4% of prepubertal and 3.8% of postpubertal respondents" (Palinkas LA, Cravalho M, et al. 1995 as quoted in Simpson & Simpson, 1999, p. 2).

The survey created for this research aimed to understand whether the participants thought they had suffered from SAD during winter times. According to the results, only 20% of the participants supposed they do not suffer from SAD (Figure 7).

1.4.3 Causes

Through reviewing the literature, it soon became clear that the cause for SAD syndrome has not been recognized as one but rather as a combination of many factors. In 2014, researchers from the University of Copenhagen, led by the researcher Brenda Mc Mahon, found the biochemical cause of SAD. From their experiment resulted that the activity of the protein SERT that transports serotonin (the neurotransmitter responsible for mood) increases during winter in SAD patients; this causes the serotonin to be less active. This phenomenon happens in the winter when the hours of natural light decrease. Whereas, in summer sun naturally keeps the



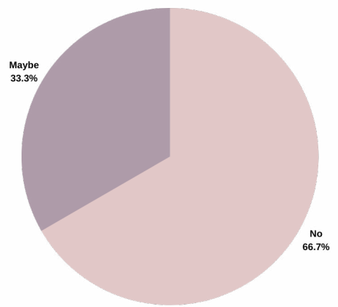


Fig. 8,9 The charts show what participants answered when they were asked to say whether they think they suffer from SAD or not. The answers have been divided between people living in Finland (blue chart) and people not living in Finland (red chart). However it is important to consider that between the participants only three people did not live in Finland but in Italy; therefore, it is not possible to draw conclusions from this results.

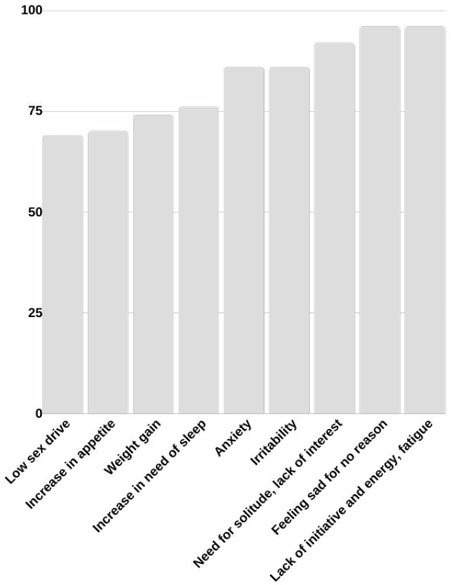


Fig. 10 Common fall and winter SAD symptoms.

SERT activity to a lower level (European College of Neuropsychopharmacology, as cited in ScienceDaily, 2014).

1.4.4 Possible remedies and prevention methods

SAD is a classic problem in countries characterized by dark winters when the sun rises late in the morning and sets early in the afternoon. The depressive symptoms have been reduced by light therapy, vitamin D supplement, Cognitive Behavioral Therapy ("Seasonal Affective Disorder and Complementary Health Approaches: What the Science Says", 2019), self-help methods and medical prescriptions.

Some of the self-help methods, that can be both cure and prevention methods, suggest to continue exercising during winter, pay attention to what we eat trying to eat healthy food, have healthy sleep-wake schedule (Grohol, 2019) plan in advance enjoyable activities for the winter and spend time outside as much as possible ("Seasonal Affective Disorder", 2019).
"Since mood is influenced by a complex interaction of circadian phase and the duration of wakefulness, even moderate changes in the timing of the sleep-wake cycle may have profound effects on mood" (Partonen & Lönqvist, 1998, p. 1370). Furthermore, the expert in mental health Grohol J. (2019) explains that healthy sleep-wake habits can help. People who suffer from winter depression will find benefits by limiting sleep to a maximum of eight hours, avoiding long naps during the day and having both a regular bed and wake up time.

After the consideration of the previously reported information, we can conclude on how fundamental it is to guarantee a good night's sleep as a prevention and cure for SAD; therefore, in order to limit the possible factors contributing to SAD symptoms, a relaxing environment for the bedroom is as essential as a colourful living room during winter as well as the rest of the year.

Through the survey it was asked to the participants to state how much they found useful a list of 11 help methods for the dark months of the year, rating each of them from 1(not effective) to 5 (very effective). The answers can be seen in Figure 11. The chart indicates that the three most shared and possibly effective help methods are, in order of relevance: exercise, walking outside and bright light sessions. Furthermore, the possibility to respond with a personal comment to the question "What do you do to help yourself cope with the darkness during winter?" was given to the participants.

Comments:
- "I sleep more. :) Also having friends over, eating together and sharing life helps."
- "Nothing helps really. Just have to suffer it."
- "Gather with friends and try to keep busy in general."
- "I decorate with lights."
- "I dance -->very effective."

1.4.4.1 Light therapy in SAD treatment

One of the possible treatments for SAD is the bright light cure. According to Partonen & Löngvist (1998) the best way to start the treatment is with 10-to-30 minutes sessions in which the patient is exposed to 2500 lx of artificial light during the morning. As a matter of comparison, to understand that value, it is useful to remember that "The average illumination of a sunny summer day is between 50,000 and 100,000 lux" (Arnkil et al., 2007/2013, p. 276).
"A meta-analysis of controlled trials of 332 patients with winter SAD revealed that 2500 lx light administered via a light-box device in 2 h daily morning sessions for 1 week led to improvements in 67% of patients with mild depressive episodes and 40% of those with moderate to severe depressive episodes" (Partonen & Löngvist, 1998, p.1371). Furthermore, green-coloured light and blue-coloured light have been found to be more effective than red-coloured light in curing SAD (Oren et al., 1991; Strong et al., 2009). Whereas, in other experiments testing the effects of colours, red colour resulted being the hue with most influence on human mind and body (Küller, Mikellides & Janssens, 2009).

1.4.4.2 Medical prescription and bright light

A study conducted by the Mood Disorder Centre of Vancouver showed that light therapy and antidepressants can have similar results in curing SAD (Lam et al., 2006). An example of a bright light lamp can be seen in Figure 12.

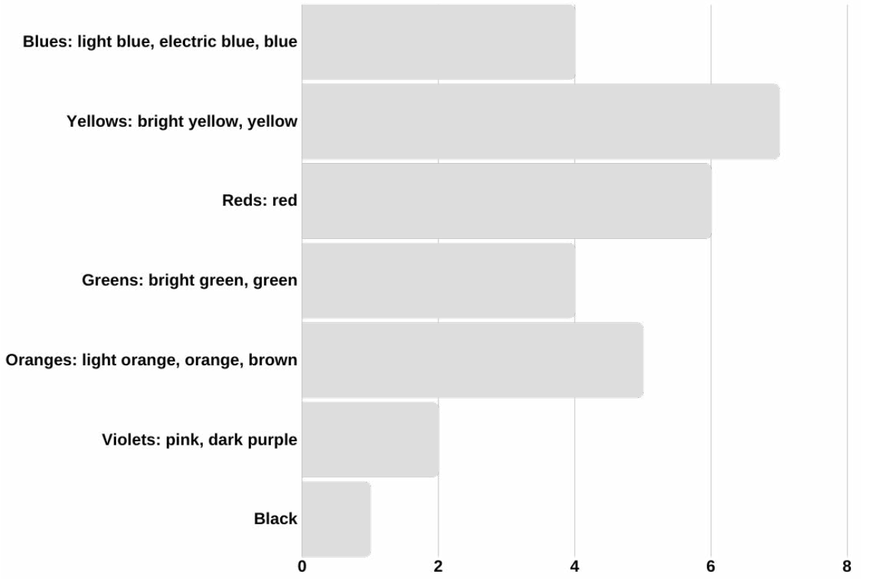


Fig. 11 Answers from the survey question: "What do you do to help yourself to cope with the darkness during winter? Rate the following activities according to what you find the most useful."

Fig. 12 A bright light lamp example, Rondo Led lamp by Innolux.

Summary chapter 1

In this chapter I collected all the information I believed to be useful in order to design two terapeutic patterns collections. Through this research I became aware of the existence of numerous studies concerning the topic of colour.
Colour is studied from the physical point of view, as well as why we see it. In order to analyse its nature, the phenomenon of light and difference between subtractive colour and additive colour is studied. Afterwards, the text covered the theme of the relation of the body with colour and coloured light. Subsequently, the research focuses on how to use colours indoors. Discussing the inquiry concerning colour influence on humans and the analysis of colours for domestic interiors, the new notion of “colour preferences” is described. The last part of chapter 1 investigated the phenomenon of SAD, describing the symptoms and concentrating on the causes and possible remedies.

Chapter 2

Introduction

Chapter 2 aims to answer the research subquestion and reports the design process of the two prints collections, the colour schemes and material boards.

2. Design Project: development process of two SAD-symptoms alleviation print collections for Scandinavian homes; six material boards and six colour scheme proposals

2.1 Explanation and discussion on the chosen methods

A combination of Qualitative and Quantitative approaches was the suitable method to fulfill these research aims. This way of proceeding is defined research triangulation, specifically the term “Methodological triangulation” is used when the author uses different methods together (Muratovski, 2016).
The case study research approach was an ideal method to gather data for a topic with little information written about it (the therapeutic use of colours for domestic interiors and interior textiles as an alleviation cure for SAD symptoms); for this reason a qualitative approach seemed to fit this study. The theory at the base of this study supports the idea that the lack of colour in winter causes SAD syndrome together with the lack of light; therefore, introducing more colour inside the homes could help alleviate these symptoms. This theory has been analyzed through literature review in the field of colour psychology, colour theory and colour therapy, as well as the medical field concerning the study of SAD syndrome (pinpointing the causes and known remedies), and the field of interior design regarding colour planning and patterns.

An online survey, shared via email link has made it possible to collect direct information. The questionnaire was divided into three parts:
Part 1) about the subjective connection of the participants to the concepts of energizing and calming with different elements (like music, movies, objects, colours and places),
Part 2) about their relationship with their home all year round,
Part 3) about SAD and its milder versions and how do they cope with darkness in winter,
Part 4) about their relationship with their home, SAD and colours.
Regarding the creation of the pattern collections, I did not consider all the answers collected through the survey. In fact, I preferred to use the same kind of questions (Which colour do I connect to the concepts energizing and relaxing? Which colours would I use to create an energizing or relaxing atmosphere in my home?) to direct my brainstorming while looking for inspirations and themes for the productive part.

A tutoring meeting was organized with professor Laura Arpiainen, expert in Health and Wellbeing Architecture, in order to discuss the thesis topic. This meeting resulted important for the project, since she recognized the possible role of colour in causing SAD symptoms as a secondary factor after light and circadian rhythm. It was also suggested to venture deeper into the field of Colour Therapy (warning me about the commonly shared scepticism about it) and of chakra (strictly connected to Colour theory), (L. Arpiainen, personal communication, September 16, 2019).
Eventually, the colours used in the collections were not selected following Colour Therapy principles. I, as a designer, I did not plan the collections for specific customers but for a specific syndrome that is not strictly related to a part of the body. However, customers, interior designers and architects can keep in consideration Colour Therapy principles in their decision-making process.

Furthermore, I had the chance to organize two meeting sessions with architect Federica Cattaneo, who is working at Ambienti showroom in Helsinki. During these tutoring sessions I received a professional feedback 1) about the print collections and colour schemes organisation and 2) about the material boards proposals. Federica Cattaneo helped me coordinating the collections. Her point of view encouraged me to emphasize the link between the them.

Moreover, the opportunity of having palette of colors and material samples from Ambienti showroom, helped me, not only for the creation of the material boards, but also to contextualize better my collections of prints. In Figure 13 is possible to see the the way the collections have been organized .

2.2 Project presentation

The aim of the design project is to answer the second of the main research questions: How to develop and design patterns collections for domestic interiors that will alleviate winter SAD symptoms?

At the start of the thesis process, the topic was defined together with the decision to learn how to create a design solution that could alleviate, if not cure, SAD symptoms. Hence, the result needed to be energizing and aiming to be used during everyday life. I personally perceived SAD as something that lowers strength and cheerfulness during the winter months.
Therefore, I gravitated towards the idea to design an energetic print collection. Subsequently, I realized that the decision to make one of the two collections “energetic” had been initially a very subjective idea. However, this theory was later supported by the research explored during the literature review. For instance, one of the common symptoms of SAD are lack of energy, fatigue and feeling sad for no reason: this is why an energetic input in everyday life could actually make a difference.
The idea to produce a second collection for the bedroom, which could inspire calmness and relaxation was created after the research had already started. In fact, one of the ways to alleviate SAD symptoms is to have a healthy sleep-wake cycle (Grohol, 2019); therefore, it is important to sleep within a restful environment where, if appreciated by the people sleeping in that room, there could still be enough stimuli to help waking up in the morning.

Overview

A practival approach to the design outcome:
start from the colour scheme suggestion, imagine to use it in a room and add there the print designs and the material boards or part of them. For instance, a print can be used as the colour accent for a room. Furthermore, the material boards give information about the kind of materials that could be used; however, they do not represent the correct colour proportions.

Fig. 13 The Figure shows the organisation of the two print collections together with the material boards and colour schemes

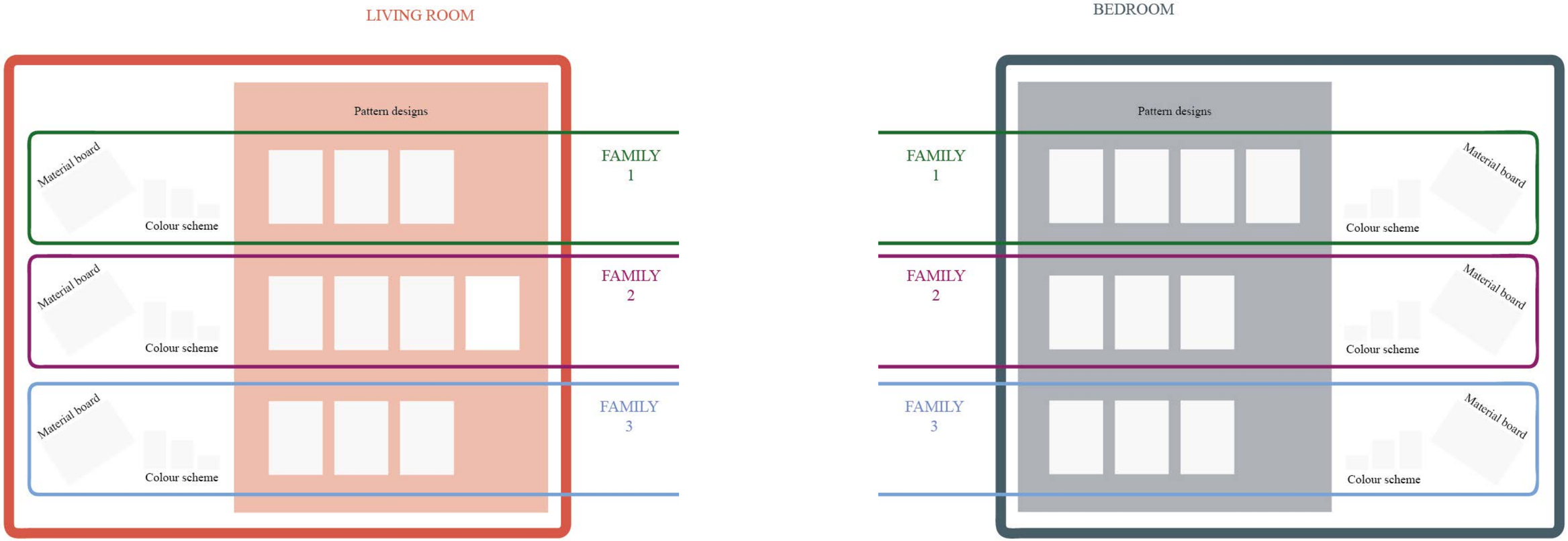


Fig. 13 This Figure shows the organisation of the two print collections together with the material boards and colour schemes proposals.

	LIVING ROOM	BEDROOM
Character	Recreative → both bright and calm colours, active → bright light and colours, stimulating → background in contrast with the rest of the environment, lively → carpet and curtains in contrast with the walls.	It is a place for relax → soft colours, calm and pacific character → hues near in the colour wheel, neutrals, a heaven like atmosphere, safe place, welcoming and cosy, intimate → dark, rich deep hues.
Function	A place where it is possible to develop hobbies, it must inspire an active life, it should give similar benefits of a walk in the open air during a sunny day: freshness, energy, regenerative effect; it is a place where people can work → not contrasts of colours that differ a lot in brightness; it is a place where during winter people spend a lot of time → therefore prints and colour combinations should not be too excessive.	It is a quiet, cosy and safe place where people can relax by taking a break from the daily routine, a place where they can easily fall asleep; It is the place where they end a day and start a new one therefore it needs to have the ability to give enough energy and curiosity to wake up in the morning.

Fig. 14 Colour planning: definition of the character and function of the rooms and general guidelines about designing pattern collections that respect those characteristics.

The design outcomes of this project are two collections, one for the living room and one for the bedroom. Each collection is composed by ten print designs, three material boards and three colour schemes proposals. The material boards were created as supporting tools to define the character of the collections. The target audience are the inhabitants of Scandinavia. At the same time, the notions and design solution of this work can be used by anyone who will find them useful. Both collections are structured to contain designs that could be used in the same house, following the principle suggested by Danger (1987), according to whom widely differing patterns from one room to another are to be avoided. This was subsequently accomplished:

(1) by selecting few bridge colours (red and orange) between the collections. Such decision was made by following the example of the Dutch designer Hella Jongerius who used bridge colours to connect the individual wheels of the library in her research project for Vitra (2016). This example was then used as inspiration to create bridge elements that have been used in more than one family. An example can be seen in the design *Veil of flowers* whose repeating module has been used also in *Flowering meadow* design (see the collections at p. 67 and p. 51);

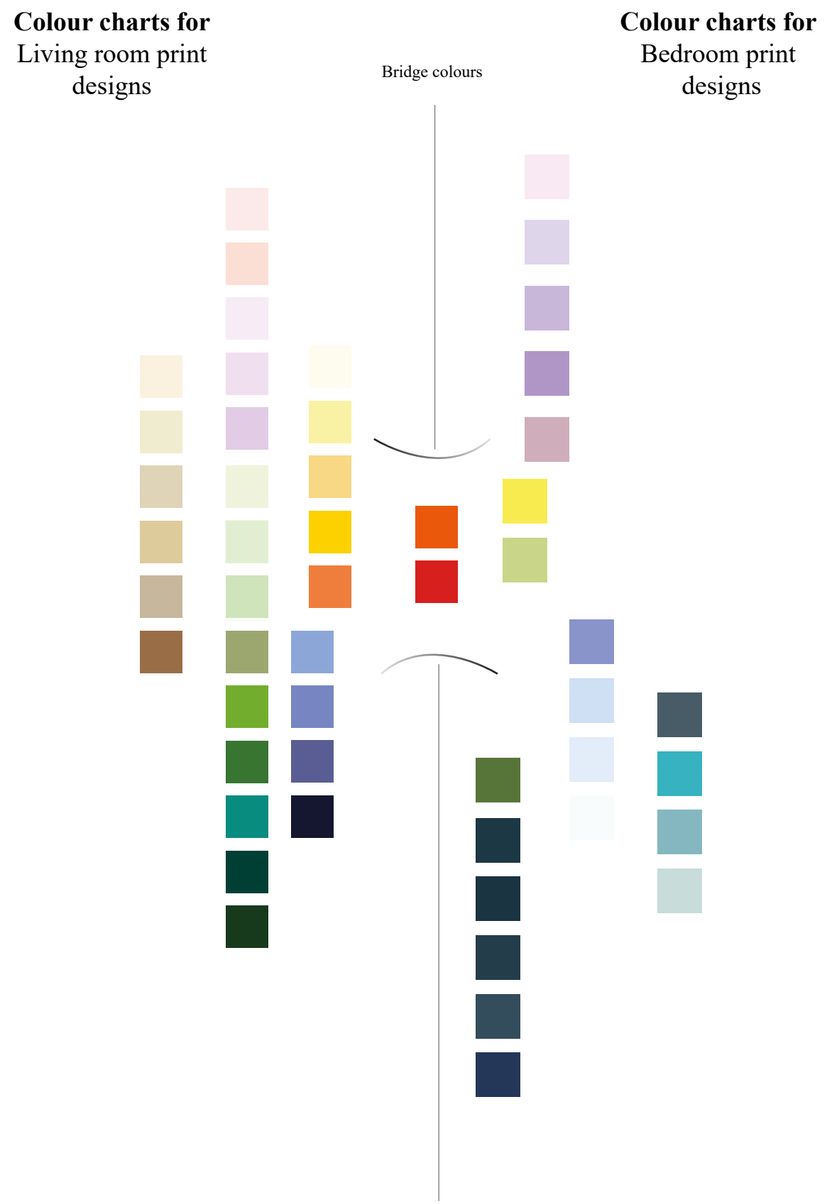
(2) using the paper cut tecnique both for the living room and the bedroom designs; in this way the collections are connected by similar silhouettes and style of the designs (E. g. designs *The squirrel´s burrow* and *Flowers bouquet*;

(3) each family of prints (in a total of three families per collection) is directly connected with a family from the other collection. Similarly, each material board and colour scheme proposal (one per family) is planned to work together with one material board and colour scheme proposal from the other collection, with a total of six families, six material boards and six colour scheme proposals. The organisation of the collections can be seen in Figure 13.

The design solutions proposed in the research report are based on the notions found during the background research. These affirm that:

1. Light is a fundamental factor for the quality of human life; Colour can be used to create a pleasing environment;
2. Being surrounded by favoured colours can improve the mood as stated by Danger (1987) and Best (2012);
3. The main cause of SAD is the scarcity of light during winter, which is the time of the year when we spend more time indoors;
5. The implication that decorating our domestic environment with favoured colours, as well as practicing a healthy lifestyle and self-help cures (like exercise and the use of bright light), will help alleviate SAD symptoms.

It is necessary to clarify that the final choices in the selection of the colour schemes have been made as a designer with personal preferences about energizing and relaxing concepts. Similarly, Danger (1987) suggests to follow personal predilections in the choice of colour for domestic interiors dec-



oration. However, generic guidelines about colour schemes planning were used as a starting point and later adjusted to personal preferences. Before starting the design process I defined the main aspects for both rooms: their character and their function (see Figure 14).

Fig. 15 An example of the look of Finnish apartments before the final furnishing.

2.2.1 The setting for the design project

2.2.1.1 Scandinavian houses

These two print collections will be designed targeting common Scandinavian houses, which are usually furnished with wooden floors, white walls, white doors, white window frames and often white furniture; therefore meeting some of Danger's (1987) criteria. Examples re displayed in Pictures 15, 16, 17. In fact, bright colours, (especially on ceilings), are good for reflecting light, while neutral colours on the floor are suitable for creating a calming environment.

2.2.1.2 Less white, more polychromy

This thesis supports the idea that people affected by SAD should introduce more colours into their houses to convey energetic and/or relaxing moods without, however, going against their personal preferences. Doing so, they might find benefit from the company of colours during the dark season by reducing the excessive presence of neutral areas like the extreme use of white. Similarly, Danger (1987) supports the idea that white needs to be combined with colours; he affirms that colourful areas are important for all-white interiors because they allow the eye to rest and avoid monotony. For instance, in the living room, accents like curtains, rugs and decorative cushions can be pleasant to see.

In Scandinavian countries blackout curtains and blindings are widely used because of the long days during summer. On the other hand, during the dark winter it is more common to have lighter fabric curtains for privacy that would otherwise be limited because of the big windows and the contrast between the artificially illuminated domestic spaces and the darkness outside. This is a fact that can be observed every day during winter when walking in the streets or even while sitting in a bus.

Another factor to consider in furnishing and colour planning Finnish houses' interiors is the severe difference of natural light between winter and summer. This phenomenon would require floor and/or walls in neutral colours, so that it would be possible to carry out colour adjustments from one season to another. Danger (1987) suggests changing the colour of the furniture with the season, for instance, using warm hues for the winter and cool hues for the summer. The easiest elements to change being upholstery covers, curtains and rugs. Another variety of seasonal change can be done by moving the furniture focusing our attention towards the windows during summer and inwards during winter (Danger, 1987).

Furthermore, since artificial lighting is essential during most of the year, it is important to choose hues that look optimal with it (Danger, 1987). In relation to this aspect, Arnkil et al. (2007/2013) specify that if an interior space has low illuminance (under 300 lux), colours with a low temperature convey a better feeling. In contrast, when illuminance is bright (over 1,500 lux), cold and bluish colours with a high temperature provide energizing feelings (Ibid.).

Fig. 16 An example of the look of Swedish apartments.

Fig. 17 An example of the look of Danish apartments.

2.3 Design process

Process in chronological order.

September-January 2018-2019

- Definition of the thesis topic
- Starting of the background research

February-July 2019

- Brainstorming to find a theme for the print collections
- Deeper background research
- Further brainstorm to find a theme for the print collections
- First selection of colour palettes for the two prints collections
- Definition of the moodboards
- Image research in order to define the style of interiors, atmosphere and materials of each room. The pictures were used as reference for the “setting”.
- Further work on the colour palettes, decision to have some colours and print designs in common for both collections (bridge colours and bridge designs)
- Further work to define the moodboards: pictures research and pictures collage to create moodboards able to communicate the desired atmospheres for the living room and bedroom

August-October 2019

- Following Danger’s (1987) suggestions, I defined the character and function of the rooms (see Figure 14). Factors like room size, orientation and final users were left undefined since this design project is not directed to a specific client.
- Drawing and sketching the print collections
- Selection of the prints and first draft of the two collection maps
- Further background research
- Start of the “colour planning” process by keeping as reference the moodboards, the collection maps and background research: for each room I decided to choose one dominant colour (60% of the whole composition) and its tone variations, a secondary colour (30%) and accent colours (10%)
- Colour planning for each of the collections: selection of a dominant colour, a secondary one and some accent colours (this first draft of the colour schemes can be seen if Figure n).
- Decision to have in each collection one or more prints in which most of the family colours are present in order to use them as a starting point for all the other designs with the aim to design coherent collections
- Further background research
- Decision to develop all the studies done through material boards and colour schemes proposals in order to define the atmosphere, theme and colour palette of each family and collection
- Digital elaboration of the patterns
- Reorganisation of the prints in “cross families” (as previously explained and represented in Figure 13)
- Material boards organisation and pictures
- Selection of the colour charts and bridge colours for the print designs collections
- Definition of the final colour schemes

In the complex, the whole process lasted 14 months, starting in September 2018 and continuing till the end of October 2019. During this period of time:
- The background research → approximately ten months
- Moodboards creation→ approximately eight months
- Collections colour charts → eight months
- Prints collections design process → four month
- Material boards → one hree weeks
- Colour schemes → one week

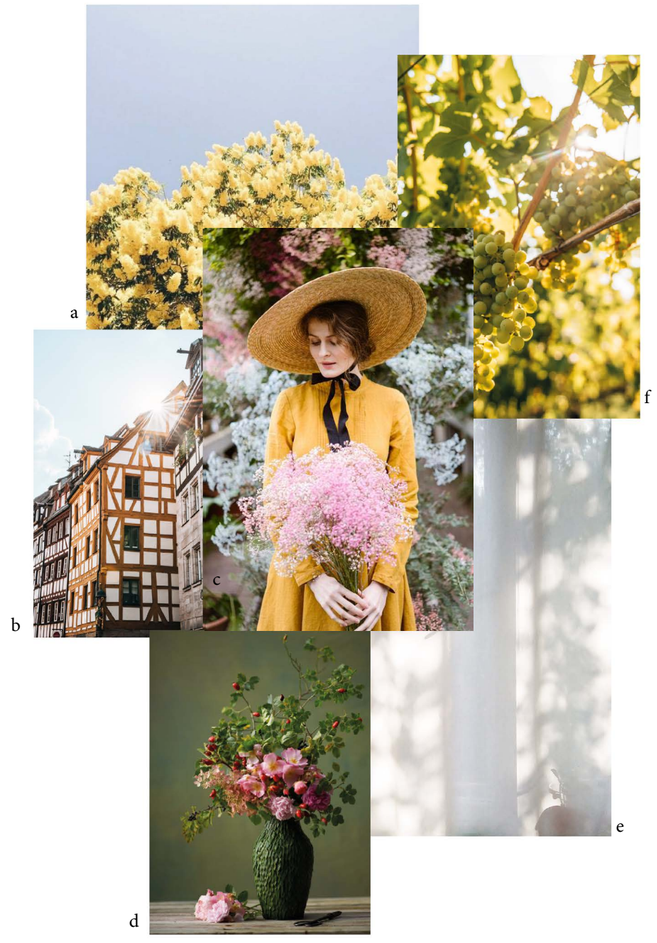
Thanks to this list we can see that the background research is the phase that occupied most of the time in the whole process. In fact, since the start I was aware of the importance of the literature review for my project. Without the data collected through the months of research it would have been difficult to develop an accurate SAD-symptoms alleviation designs.

Process:

The first drafts of the colour chart for the living room (top) and bedroom collections were created before starting the ketching phase.

2.4 Design outcome

LIVING ROOM



2.4.1 LIVING ROOM:
Moodboard, colours and pattern designs

The living room prints were inspired by elements that spark joy into my personal life all year round, but especially during spring and summer:

1) Personal memories of the atmosphere of the first days of spring. For instance, the sun through fresh and new born leaves (designs p.51: *Climbing leaves* and *Leaves in the shadows).*

2) Spring and summer holidays: a city and nature different from the one I live in. For instance, a small village in the northern part of Italy, in Trentino region, and its different architecture as well as vineyards on the steep side of a hill (designs p. 51: *Austrian facade* and *Sunday trip).*

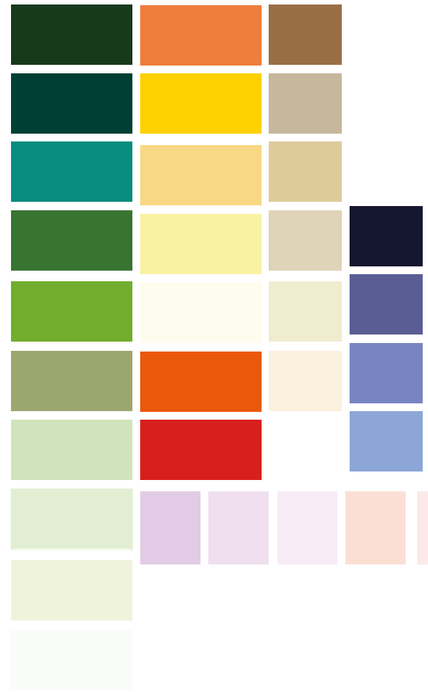
3) The new exciting colours of flowers and nature that characterize spring and summer (designs p.51: *Rising flowers, Flowering Meadow, Flower bouquet, Climbing leaves* and *Woven paper*).

4) Sun shining inside the home starting from early in the morning and the shadows of the trees projected on the walls. These represent the presence of sun, and seeing them at the start of the day or later in the afternoon causes in me a strong energetic boost (designs p. 51: *Leaves in the shadows, Memory from the summer* and *Summer photons*).

The aim of the pattern collection addressed to the living room is to be energizing while suggesting action and joy. In order to reach this goal the sketches for the designs were realized using the papercut technique. Such technique allowed to enhance the contrast between colours and to create shapes with hard edges. Similarly, some of the prints (designs p. 51: *Climbing leaves* and *Leaves in the shadows)* depict leaves growing towards the top, with the aim to inspire an energetic mood. A white an airy background was often preferred for the prints of this collection in order to reflect more light and to create more contrast with the other colours. Furthermore, some of the patterns were designed in a large scale following

2.4.1.1 Colour charts for

Living room print designs



the suggestions from the books by Danger (1987) and Birren (1961).

The choice to represent flowers and plants in the designs can be explained by the intention to literally transpose spring and summer vegetation inside the domestic space for winter times. This process is similar to the gathering of food supplies for the winter but instead, it is done with colours. Therefore, the possibility to dedicate the month of August to sketching was essential for the collection's design process. This period of contemplation was fundamental in finding the right inspiration rich of summer colours, images and feelings and select what I wanted to transfer to the winter through pattern collections.

Colours were selected with the purpose to recreate a summer atmosphere indoor. For this reason I used yellows and greens in 50% of the designs. The choice of using yellows was supported by the survey answers, in which yellow resulted the colour more connected to energy and energising atmosphere.

Reds (40%) and dark greens (40%) are the colours used to create contrast with other hues in order to excite and be energizing.
All the print designs for the Living Room collection are colour separated. The sizes of the designs repeats have been selected in order to be suitable to be printed with the most common printing systems in the textile industry. For instance, the height of the repeats is a number that can be evenly repeated in to 64 cm which is the circumference of the rotation screen printer.

Fig. 18

“Start your day as if the sun was shining and remember the light even in the darkness”

When we wake up in the summer, there are signals that suggest whether it is a sunny day or not. These signals are what usually gives us the energy and enthusiasm to start a day. One of these cues is, for example, sunshine coming inside the bedroom through the curtains and spreading on the edges of the wall near the windows (see Figure 15). We can find more signals of the presence of the sun when we enter the kitchen or living room where its presence is clearly manifested because of the bright diffuse light in these rooms together with the shadows and bright spots projected on the furniture, curtains or floor (see Figure 8-21). This phenomenon inspired me to reproduce the shiny shapes in which the sun manifests itself as prints. Using this method, the prints convey the feeling that the sun is shining and could possibly trick the mind (reflections of the author).

Fig. 18, 19, 20, 21
Pictures taken from my private apartment in the mornings during the summer.

Fig. 20

Fig. 19

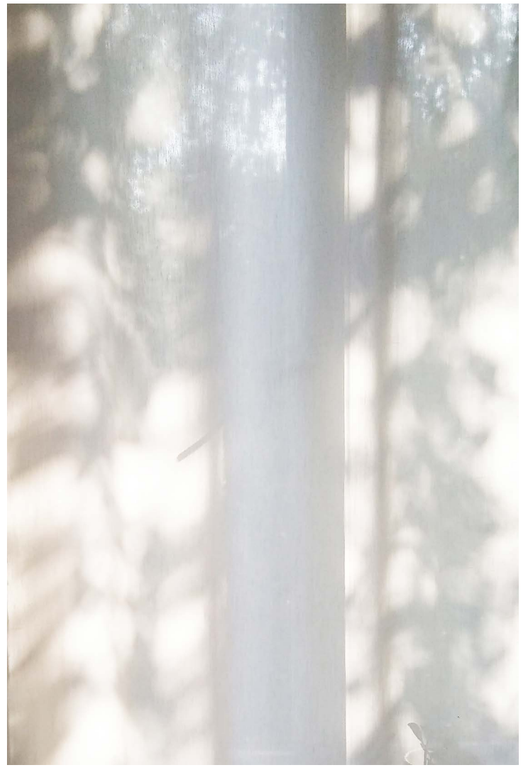
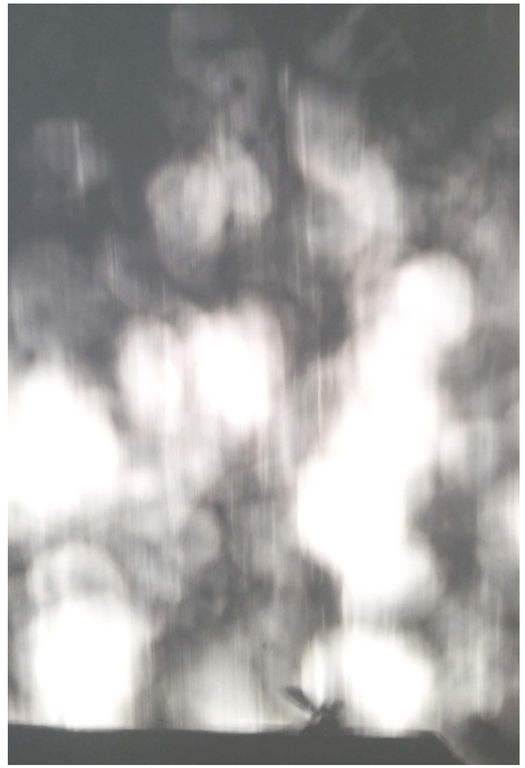


Fig. 21



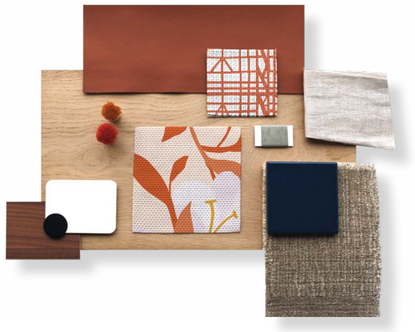
2.4.1.2

Living room collection

Colour schemes

Material boards

Family 1 →

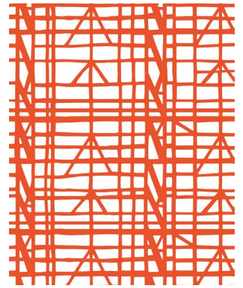


Family 2 →

Family 3 →

Print designs

Rising flowers



Austrian facade

Flowering meadow

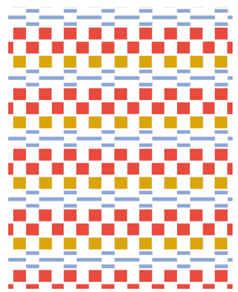
Flowers buquet

Climbing leaves

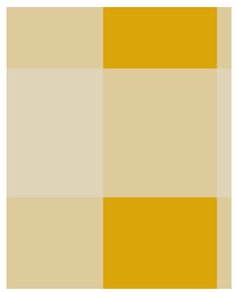
Leaves in the shadows

Memories from the summers

Sunday trip



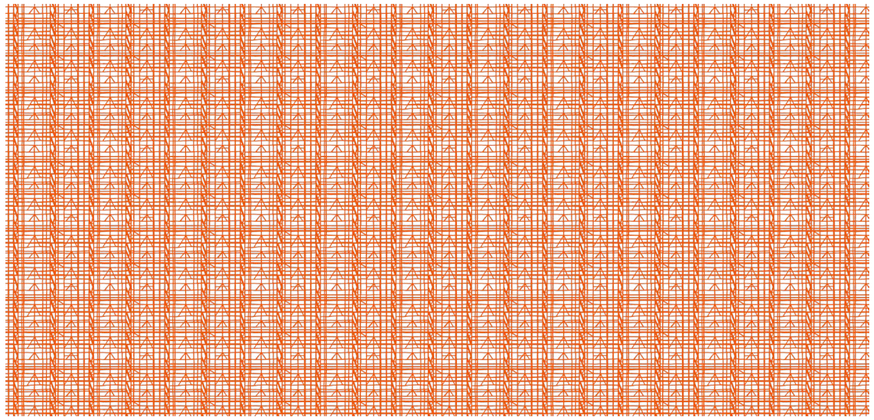
Woven paper



Summer photons

Repeats

Repeat: 35x50 cm



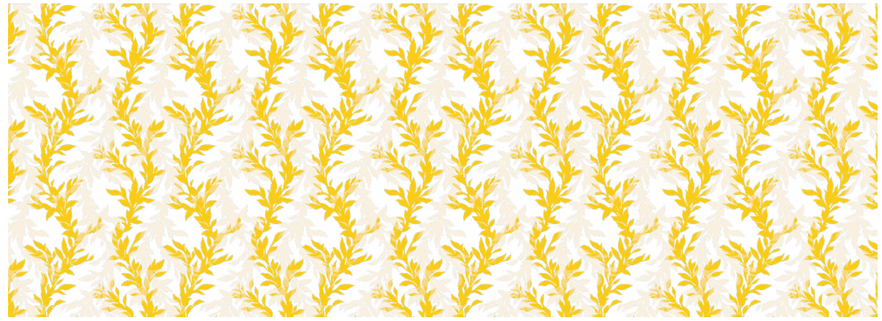
Repeat: 17,5x16 cm

Repeat: 32x32 cm

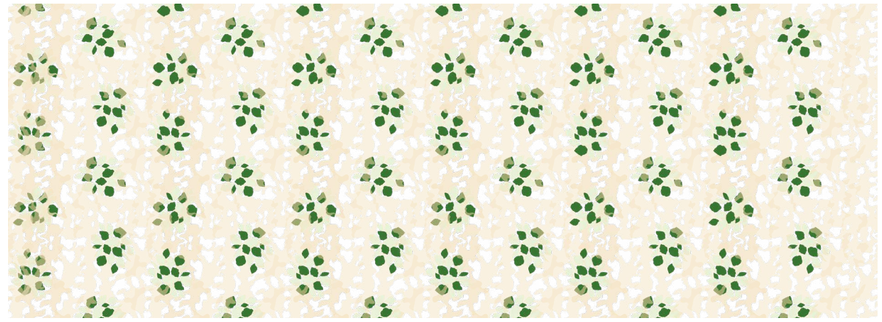
Repeat: 40x32 cm

Repeat: 64x64 cm

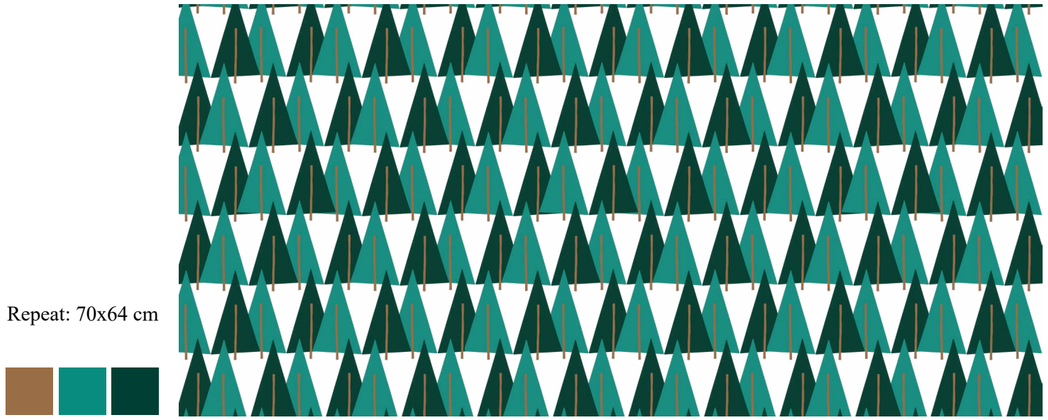
Repeat: 32x32 cm



Repeat: 32x32 cm



Repeat: 70x64 cm



Repeat: 10x8 cm

Repeat: 32x32 cm

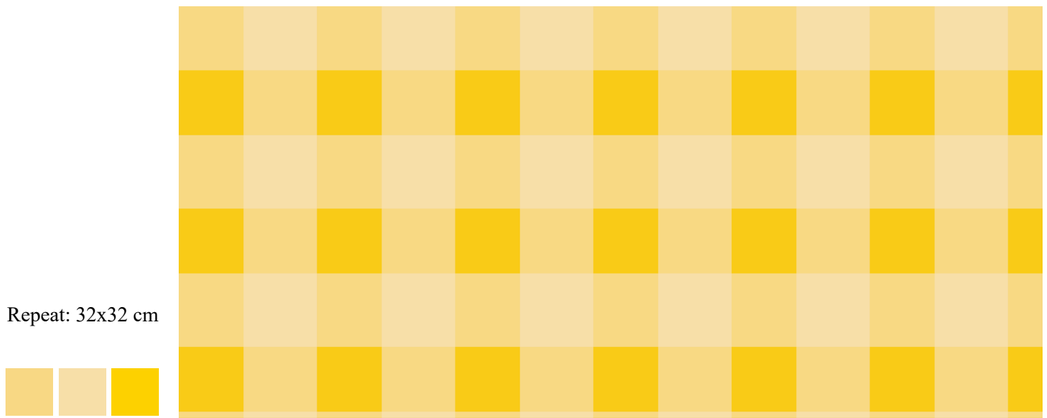


Fig. 22

Fig. 23

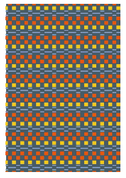


Fig. 24

BEDROOM

2.4.2 BEDROOM:
Moodboard, colours and pattern designs

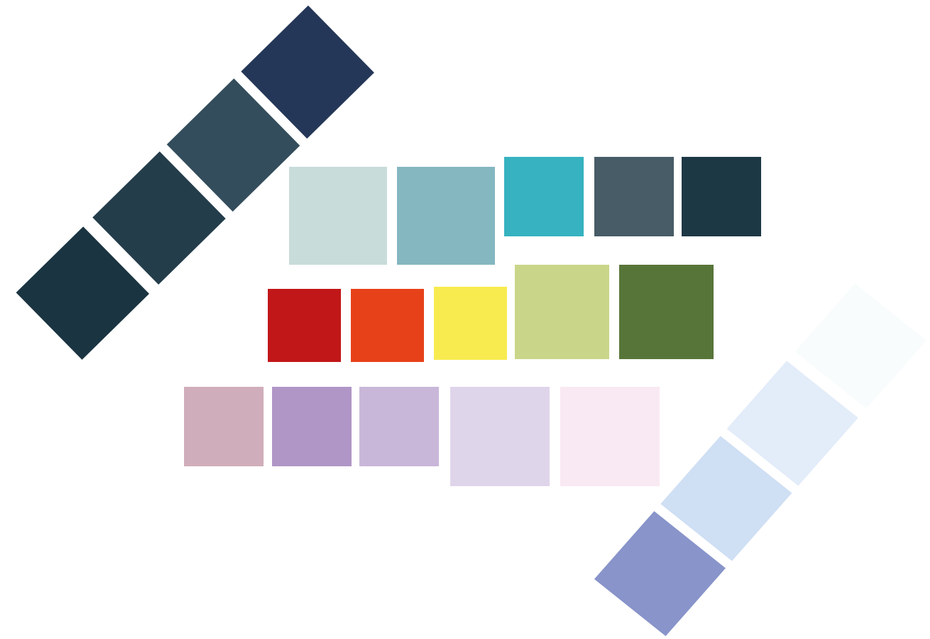
The inspiration for the collection addressed to the bedroom derives from personal memories of summer nature and from some of the aspects of winter that I love the most. For instance, relaxed moments, the cozyness of a warm bed covered with soft blankets and a bedroom decorated for the winter with adorned surfaces.

The goal of this collection is to invite people to rest and, at the same time, help them waking up in the morning. In order to reach such aim, watercolours were the principal technique for the sketching of the designs together with a minority of designs realized with paper cuttings and acrylic painting. Furthermore, the print designs for the bedroom are rich in details and in small scale in order to help falling asleep. They are coloured not only with vivid colours, to help the awakening (E. g. designs p. 67: *Summer tracks* and *Summer drops*), but also dark hues, to inspire intimacy (E. g. designs p. 67: *The squirrel´s burrow* and *The scent of leaves*) and in most of the prints the contrast between colours are less strong than in the designs for the living room. In the bedroom collection, five designs have been colour separated while the other five are meant to be printed digitally; however, almost all the repeat sizes would allow the designs to be printed with rotation screen printers.

The dominant colours of the collection are blues, followed by pinks an greens. Red and yellow are used as accent colours.

2.4.2.1 Colour charts for

Bedroom print designs



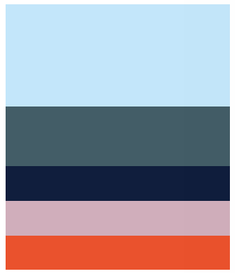
2.4.2.2

Bedroom collection

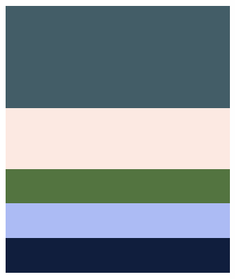
Colour schemes

Material boards

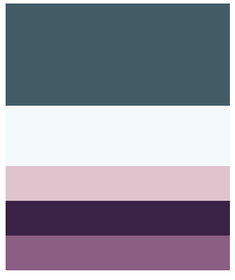
Family 1



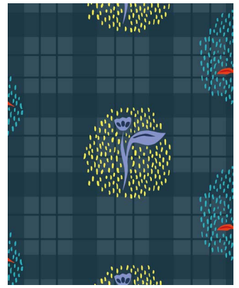
Family 2



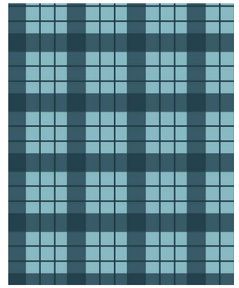
Family 3



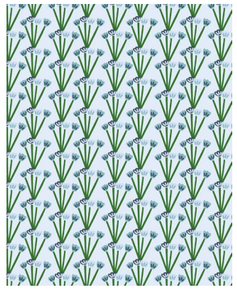
Print designs



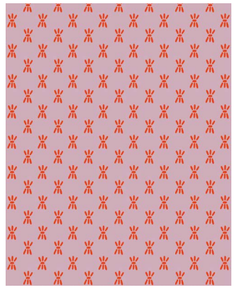
The squirrel´s burrow



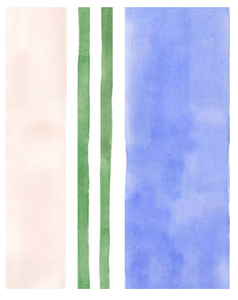
Bricks



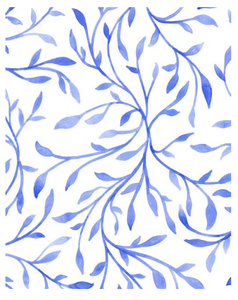
Veil of flowers



Summer tracks



Sunset

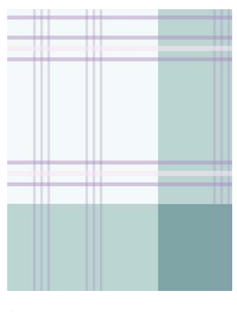


Little blue leaves

The scent of leaves

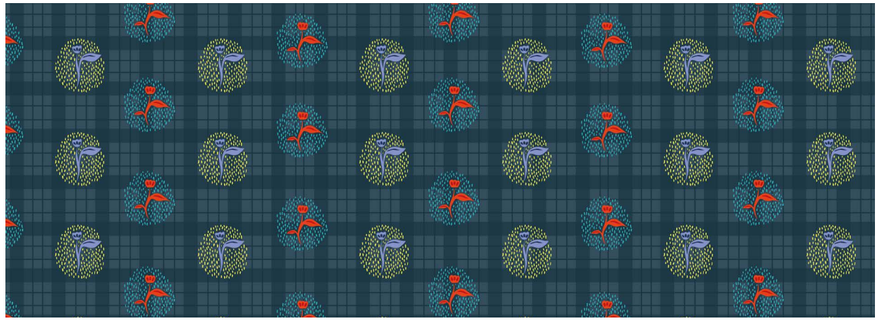
Floating trees

Summer drops

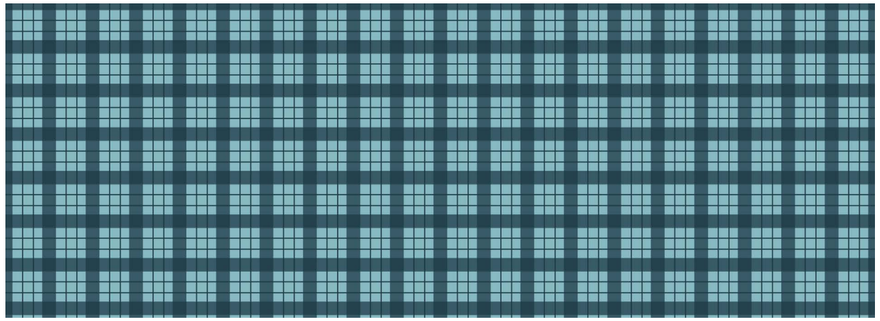


Seasons crossing

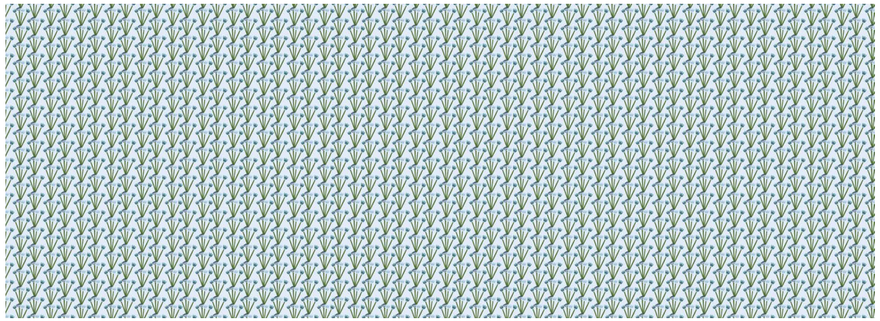
Repeats



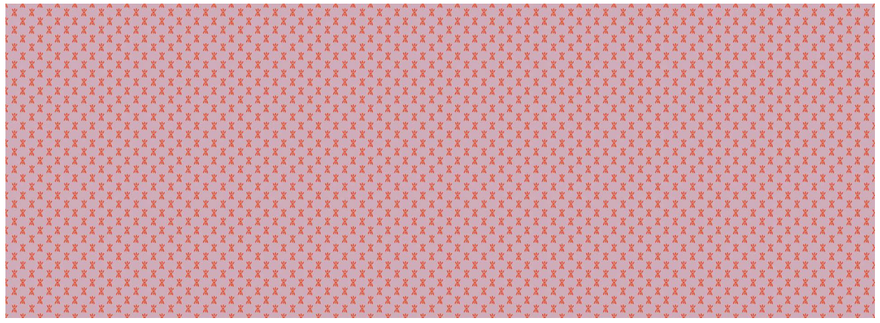
Repeat: 70x64 cm



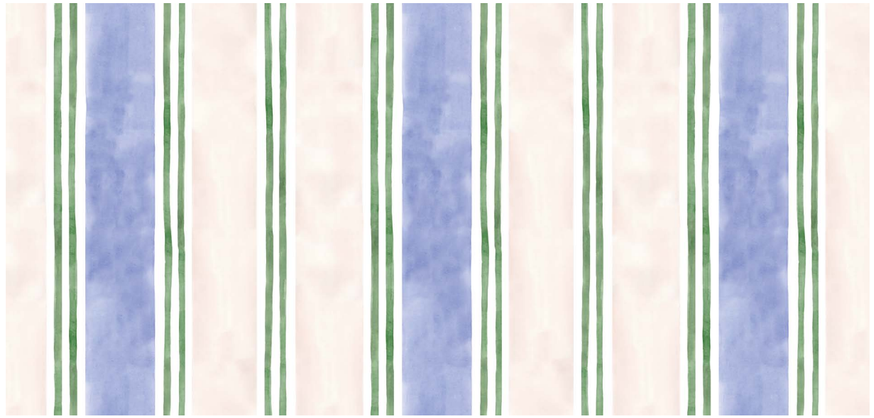
Repeat: 10x10 cm



Repeat: 7x4 cm

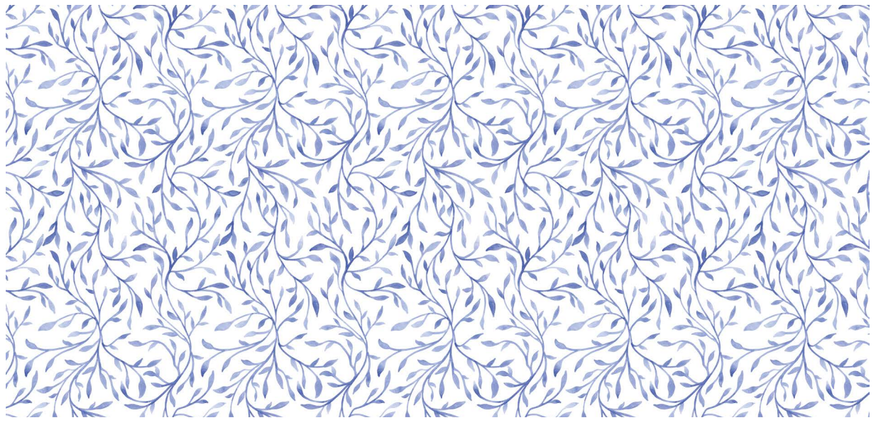


Repeat: 4x4 cm



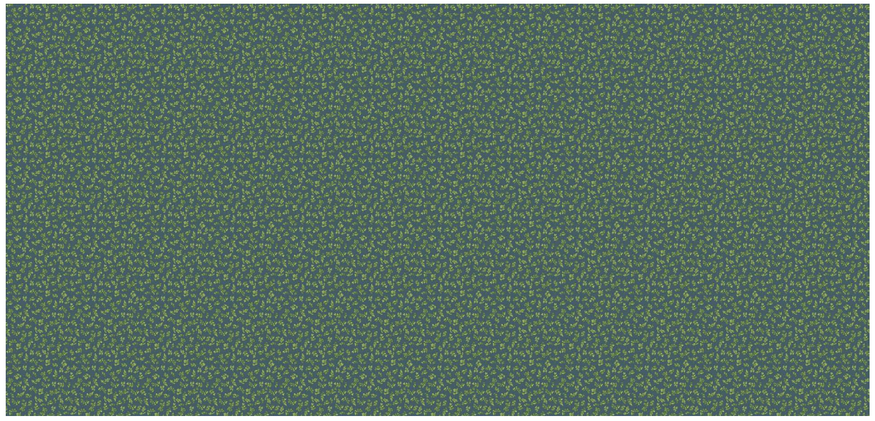
Repeat: 55x64 cm

Digital print



Repeat: 35x48 cm

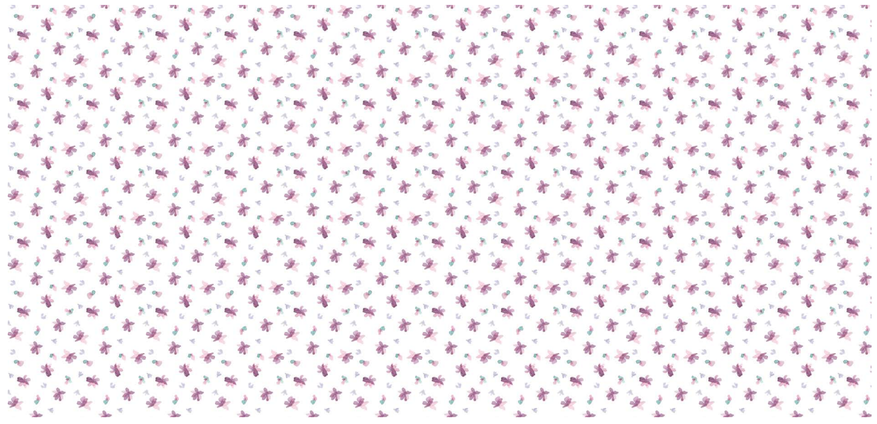
Digital print



Repeat: 16x16 cm

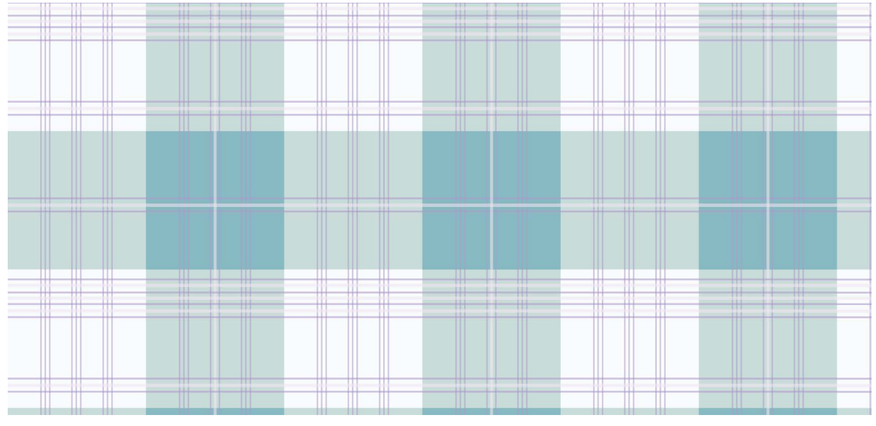
Repeat: 150x220 cm

Digital print



Repeat: 32x32 cm

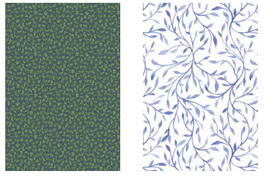
Digital print



Repeat: 64x64 cm

Digital print

Fig. 25



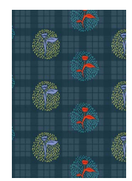
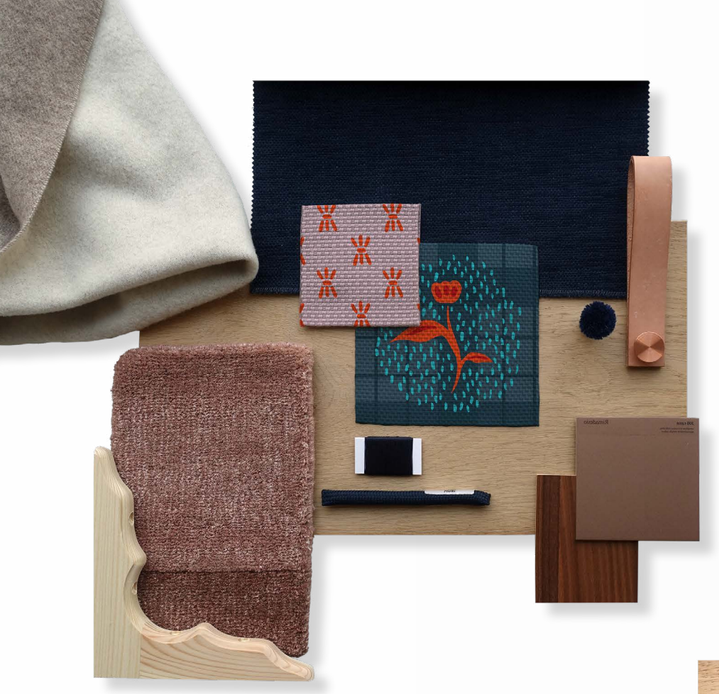
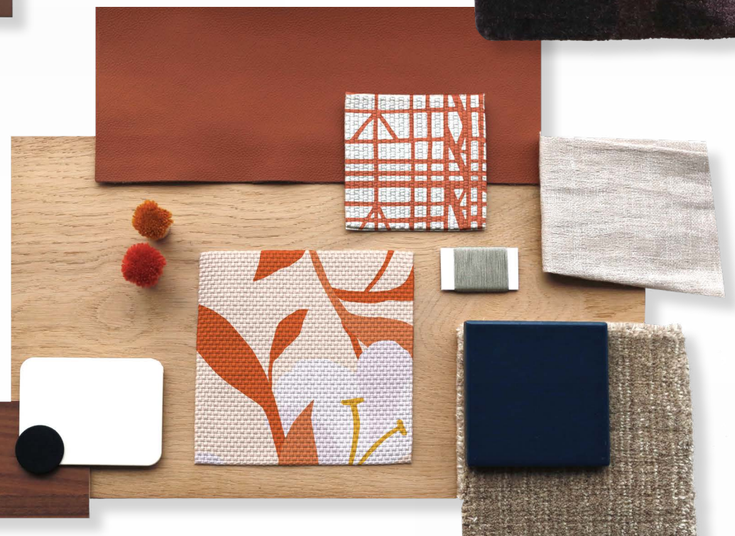
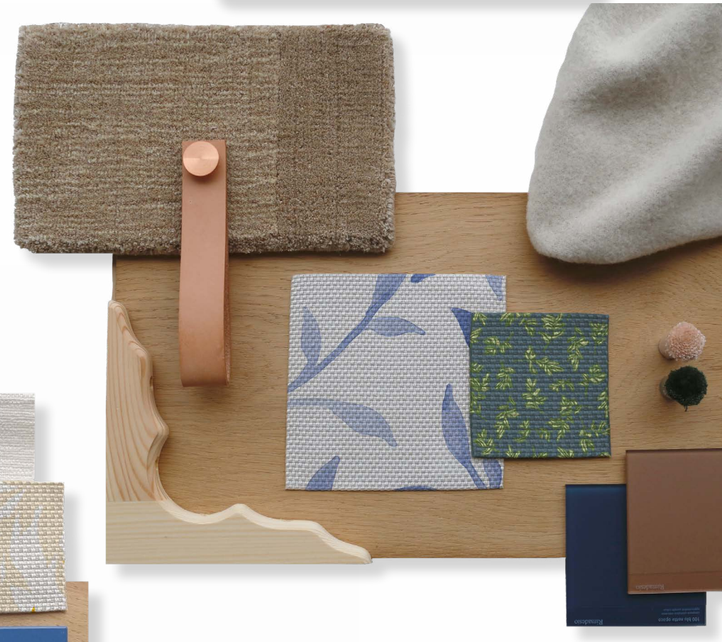


Fig. 26

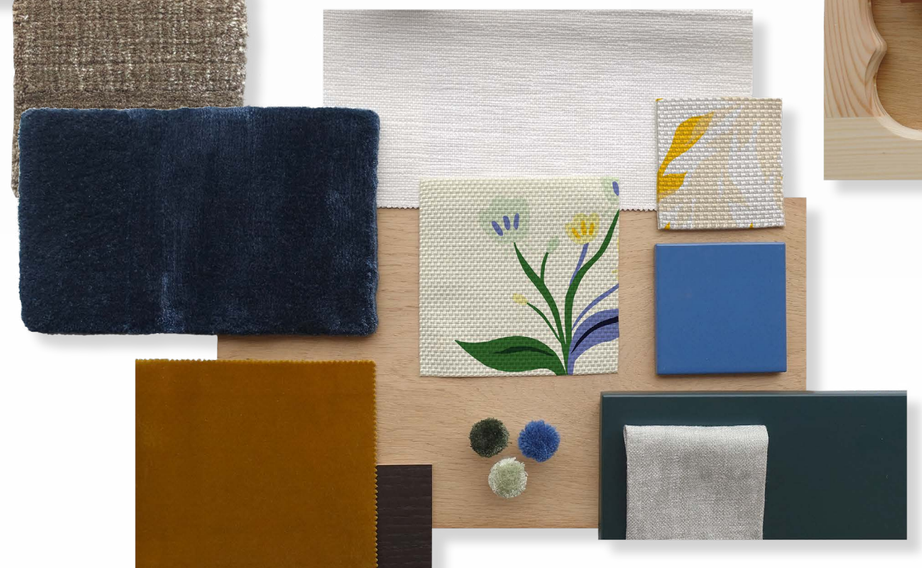
Fig. 27







Carpet samples from Poliform
Glass samples from Rimadesio
White plastic sample from Vitra
Small woollen sample for carpets from Cc-tapis
Small wooden sample from Antoniolupi
Textile samples and yarns from Poliform
Wood flowring made out from durmast
Support for shelf from Bauhaus
Blanket from Tiger of Sweden
Glazed ceramic tiles from Made a Mano
Black metallic disc from Vola
Leather handle from byLassen
Blue cord from Paola Lenti



Summary chapter 2

Chapter 2 aimed to present the productive part of this project: two pattern collections (twenty designs total), six colour schemes and six material board proposals. The design outcome and its production have been described in detail from the creation through their development until the final result. In this section it is possible to find the literature and other data used to produce the final design outcome.

Chapter 3

3. Conclusions

The aim of this research project was to find a way to alleviate SAD symptoms based on the use of colour (precisely subtractive colour).
During the background research, which was carried through in order to verify the validity of hypothesis, divergent data was found. Some disciplines (for instance, chromotherapy) and researchers affirm that colour as light and therefore energy can be used to heal the human body: all the individual parts are vibrating energy and each of them is connected to a specific colour vibration.
On the other hand, there are researchers who do not consider colour as energy just because it is produced by light, which is electromagnetic radiation. However, these researchers do recognize the ability of colour to influence the human mind and body in a milder way than chromotherapy. Furthermore, it has been widely recognized that the power of light and coloured light is effective in influencing people: one example being the quantitative variation of light during the year which is the main cause for SAD.

Colour is a complex phenomenon that, in order to be understood completely, requires scholars to explore various fields as physics, biology, psychology and many more. In fact, colour is a phenomenon conditioned by numerous factors and in continuous change, as each of us sees it and experiences it in different and unique ways.
Additionally, according to the majority of the research such colour effects on human mind and body are very subjective and hard to foresee. This is the reason why colour experts, interior designers and architects suggest to align the colour planning procedure to the wishes of the people who will be living in that specific environment. Nevertheless there are some generic guidelines already in place; these can be adopted and adjusted according to the situation. The most important one being that colour can be beneficial when it is liked.

Even though there is currently no evidence for colour being efficient in the cure or alleviation of SAD, light and coloured light are used to cure some diseases. Furthermore, colour is often associated with mood and, as a consequence, wellbeing improvement.
In addition, I found no reports of situations in which a person would find discomfort or depression by surrounding themselves with favourite colours in a balanced way.

Hence, this study appears to be the foundation to be able to reason that the introduction of colour in the domestic environment could improve the mood of people suffering from SAD and alleviate their symptoms. Furthermore, considering the importance of using the colours we like in our homes, a new system could be ideated in order to allow customers to buy textiles with the colour scheme that they find closer to their personal colours. This solution could be possible if we consider the advantages of digital printing on fabric.

3.1 Design evaluation

The design process aimed to answer the second main research question: how to develop a pattern collection for domestic interiors that would alleviate winter SAD symptoms.
The design outcome consisted, eventually, in two collections having each ten patterns, three material boards and three colour schemes proposals. They were designed using the information collected through the background research. In order to meet the original purpose, one collection had to be an energetic tool to be used by people during the winter times to compensate the darkness of this season. The other one had to be a tool able to help people to have a healthy sleep-wake rhythm, that means sleeping a correct amount of hours every night without exceeding or falling behind. In addition, the two collections had to work harmoniously with each other since they were planned to be used in the same house.

The hardest phases of the process were 1) the definition of the inspirational mood boards, 2) the selection of colours for both the print collections and 3) the creation of the material boards and colour schemes which required as well the selection of the best colours for the purpose of the process. In fact, I was initially prone to use many more colours for both collections and, therefore, selecting just part of them was both a difficult and essential process.
On the other hand, designing the patterns was a more smooth process. In fact, I had clear in my mind the intention to bring summer nature inside the domestic interiors.
Eventually, for the moodboards I selected the pictures with the biggest emotional impact according my judgment as a designer and I used fewer colours than expected, being them the most functional: reds, greens, yellows and blues for the energizing collection and blues, greens and violets for the relaxing collection. Additionals hues were added as accent colours.
Additionally, at the end of the thesis project, because of the knowledge acquired during this experience, I can recognize that some part of the process could have been done in a different order. From the point of view of the design process, it could have been more practical to 1) define the mood boards, 2) design a first draft of the colour schemes for the rooms, 3) design the prints, 4) define the colour charts for the print designs collections, using as reference the moodboards and the colour charts, and 5) create the material boards. In this way more time could have been dedicated to the colour planning phase.

As a whole, I consider successful the colour selection both for the living room and bedroom print designs even if for the bedroom collection I might have used too light and vivid colours. However, since they were selected with the further purpose to help the rising in the morning, they might be the right choice in order to help people waking up. Considered that, they might be disturbing for someone more sensible to light and vivid colours. Nonetheless, this kind of eventuality will always come together with any kind of colour selection since colour is an extremely subjective topic. Furthermore, I believe that the most successful pattern designs, from the point of view of the purpose of this project, are probably in family 1 both for the living room and the bedroom. Family 1 for the living room is a very energetic family whose prints and colours create a pleasant harmony. Family 1 for the bedroom succeeded in creating a cozy and relaxing atmosphere and the selected designs and colours create a balanced family. Furthermore, these two families are the ones that could better coexist in the same house.

More broadly, if we consider Chapter 2 and its aim, answering the second main research question, I believe it managed to describe and suggest one way to do it. It illustrates the process from the start to the end, explaining all the decisions taken. In this way, other designers, interior designers, architects and customers can find practical and useful data they can use to make informed decisions when designing print collections, colour schemes for interiors or decorating their homes.

3.2 Unexpected findings and false paths

At the start of this project I expected to find information proving that colour influences humans in different ways and that specific directions exist about how to use each colour as if each of them could cure specific symptoms or provoke specific emotions. Later on I discovered this idea is partially connected to Colour Therapy, an alternative form of therapy, but not to all the disciplines working with colour. In fact, colour experts, like Faber Birren, suggest differently:

> The hues of the spectrum may not be different tonics each of which is to be used for a limited number of specific ailments. The strategy is perhaps not a matter of prescribing red over blue, or green over yellow at all, but of applying any color that will call forth a favourable reaction from the patient! The magic of color becomes the magic of rainbow itself. (Birren, 1961, p.153)

Similarly, I was expecting to find some connections between colour and SAD; however, during the background research I found no notions about it. What was later discovered consisted of a few unexpected notions.

First two unexpected notions

My research started by looking for information about colour in the field of colour theory and colour psychology.
The book "Color psychology and color therapy: a factual study of the influence of color in human life" (Birren 1961) introduces studies about the way colour and coloured light influence human mind and body. However, at that point I was not completely aware of the difference between colour and coloured light (first unexpected notion). Birren (1961) provides an example of the results from the studies by Robert Gerard in his doctoral thesis where he used red, blue and white coloured light and not colour. On the psychological side, it was found that blue light might have a tranquilizing effect. On the physiological side, other common reactions were found. For instance, red light increased the blood pressure in most of the subjects exposed to this coloured light. In general, red light obtained stronger reactions than blue. However, despite the interesting results, Gerard believed that more research still needed to be done since "The medical professions are quite aware of the fact that because colour has a strong emotional impact, it is not always easy to be strictly impartial in dealing with it" (Birren, 1962, p. 274). At the same time Birren (1961, p. 141) states that the capacity of a specific hue to cause "pleasure or displeasure" can vary from subject to subject. In one of the other experiments described by Birren, Herman Vollmer made experiments with colours on many different living beings as well as human beings. However, (second unexpected notion) he was not able to define any "common biological denominator" (Birren, 1961, p. 122). This was the first surprise: at that moment the findings were showing that coloured light influences the human mind and body, but since the nature of colour and coloured light is a subjective phenomenon, it is hard to generalize their effect on people.
This notion was later confirmed by further background research in the field of interior design and architecture. Colour experts E. P. Danger (1987) and J. Best (2012) underline that before starting colour planning domestic interiors, one of the most important things to consider are the people who will be living in that house and their personalities.

Third unexpected notion

Another very useful discovery regarded the importance of the brightness as well as the hue of colour. While reporting the results of a series of experiments by Daitsch and Kogan, Birren states: "The pulse is generally slower in darkness than in bright illumination – regardless of the colors involved. Thus the application of color therapy must contemplate not only hue but illumination intensity." (Birren, 1961, p.132).

Fourth unexpected notion

With the literature review I assumed to find more information and guidelines about the use of colours specifically for prints. However, more advice was found about the colour planning of domestic interiors and how to combine colours. Nevertheless, such notions became equally important and useful because they could be used when creating the colour charts for each collection and for designing the prints themselves. Furthermore, the information collected suggested using the colour planning proposals as final outcome together with the print collections.

Moreover, it is important to recognize that I initially did not consider the difference between colour and coloured light and late in the process, I became aware of my confusion about light and colour terminology. It was critical to clarify the meaning of concepts like spectral electromagnetic radiation and wavelength of light in order to properly understand the phenomenon of colour, colour experience, the difference between light and colour and therefore why coloured light has been proved to be effective for SAD symptoms while colour has not. This happened because in the beginning of the process I did not study the phenomenon of colour keeping in consideration the phenomenon of light. For this reason I misread information that was confirming the effectiveness of coloured light as information confirming the power of colour as well. Once I noticed my confusion between the two phenomenons I decided to stop my research in order to study colour and light deeply, analyze all the data collected until that moment and look at this data from a new and more correct point of view. This situation made me realize how coloured light is more powerful than colour and therefore suppose that coloured light use combined with coloured textiles could be studied in future research as cure to alleviate or cure SAD symptoms. Moreover, deepening the knowledge of colour and light phenomenons allowed me to effectively understand chromotherapy theories and to consider them as more valuable.

3.3 Limitations and difficulties

The limitations of this thesis influenced the outcomes of this study. For instance, I needed to re-emerge from the winter in Finland before starting the design process. Therefore managing the content of this study within the time frame was a challenge and a limitation. In general, more time should have been spent on the colour planning. In fact, whereas it should have been defined at the start together with the moodboards, it was developed at the end when all the print designs were completed, even if it consists in an important part of the design outcome.

Additionally, through this research I became aware of the existence of numerous studies about the topic of colour; it is such a wide subject, requiring interdisciplinary knowledge, that I understood I had just started scratching the surface. However, I hope that what I came to know gave me enough knowledge in order to design and propose a valid solution to the SAD problem.

3.4 Reflections

At the end of this research project, I recognized some aspects of the process that I could have developed more. For example, in order to obtain more useful answers from the survey, I should have created it later in the process. Firstly, I would have known more precisely which kind of information I needed to collect. Secondly, I would have selected more carefully the participants in order to have answers from an equal number of people living in Finland and abroad. Furthermore, I should have questioned a selected audience, at the end of the design process, and question them whether they felt I reached the thesis goals with the design production or not.

3.5 Recommendations and opportunities for further researches and readings

Further research could investigate the use and integration of coloured light in domestic interiors with the aim to alleviate SAD symptoms, since coloured light has been proved to be an effective cure for SAD.

After careful analysis on the results obtained and the applied methods, I considered different investigation ideas that could have been useful for this research project. First, improving the questionnaire by asking people to match a list of adjectives to a selection of colours (on paper). Secondly, directly investigate if people can recognize colours (or learn to do it) without seeing them, and possibly do the same experiments with blind people (as suggested by L. Arpiainen, personal communication, September 16, 2019). The results could imply that if we can perceive and distinguish different colours without seeing them, they might have the power to influence us more than we think.

Further studies in conjunction with this research may concentrate on the way our home interior influences our life, and if dedicating more energy to create an environment that reflects our personality could help us in difficult moments of our life as it is winter for people suffering from SAD. Moreover, deeper studies could be done about colour preferences and understand the reason why if we surround ourself with colour we like we will feel better, be more positive or even recover from a disease.

All the data collected during this project will allow me to make informed decisions in my future life as a designer. Especially if I will be working in the field of interiors and textiles for interiors and architecture. Thanks to the knowledge acquired I will be able to create more functional colour charts for the print collections I will design.

References

Literature

Alanko, A. (2013). *Perception as an integral part of the design process.* Helsinki: Aalto-yliopiston taiteiden ja suunnittelun korkeakoulu.

Arnkil, H., Fridell Anter, K. & Klarén, U. (2012). *Colour and light: Concepts and confusions.* Helsinki: Aalto University.

Arnkil, H., Kokkonen, J. & Aalto University School of Arts, D. a. A. (2013). *Colours in the visual world.* Helsinki: Aalto University School of Arts, Design and Architecture.

Birren, F. (1961). *Color psychology and color therapy : A factual study of the influence of color in human life* ([Rev. ed.] ed.). New York: University Books.

Danger, E. P. (1987). *THE COLOUR HANDBOOK: How to use color in commerce and industry.* Aldershot: Gower Technical Press.

Eiseman, L., & Herbert, L. (1990). *The PANTONE book of color*. New York: Harry N. Abrams.

Haikonen, P. (2016). *Woven sounds / Design exploration and experimentation of acoustic curtain fabrics.* Helsinki: Aalto-yliopiston taiteiden ja suunnittelun korkeakoulu.

Itten, J. (2007). Arte del colore. (A. Monferini, M. Bignami, Trans.). (sixth ed.). Milano: Saggiatore editore. (Original work published 1961).

Jongerius, H., & Masse, S. (2016). *I don´t have a favourite colour: Creating the vitra colour & material library.* Berlin: Gestalten.

Liikanen, H. (2015). *Ground Zero - vaatetustekstiilimallisto ja väritykset.* Helsinki: Aalto-yliopiston taiteiden ja suunnittelun korkeakoulu.

Muratovski, G. (2016). *Research for designers : A guide to methods and practice.* London: SAGE Publications Ltd.

Richardson, P., & Powers, R. (2010). *Living modern: The sourcebook of contemporary interiors* (Hardcover ed.) London; New York, N.Y.: Thames & Hudson.

Online references

Azeemi, S. T. Y., & Raza, S. M. (2005). A critical analysis of chromotherapy and its scientific evolution. doi:10.1093/ecam/neh137 (September 19, 2019)

Best, J. (Ed.). (2012). *Colour design* (1st edition ed.) Woodhead Publishing. Retrieved from https://aalto.finna.fi/Record/alli.837067 (August 30, 2019)

European College of Neuropsychopharmacology (ECNP). (2014, October 20). Biochemical cause of seasonal depression (SAD) confirmed by researchers. ScienceDaily. Retrieved October 4, 2019 from www.sciencedaily.com/releases/2014/10/141020212412.htm (September 22, 2019)

Grohol, J. (2019). Self-help strategies for seasonal affective disorder. Retrieved from https://psychcentral.com/lib/treatment-for-seasonal-affective-disorder/ (August 13, 2019)

Haller, K., 2012. Colour in interior design. In: Best, J. (Ed.). (2012). *Colour design* (1st edition ed.) Woodhead Publishing. Retrieved from https://aalto.finna.fi/Record/alli.837067 (August 30, 2019)

Hurlbert, A. & Ling, Y., 2012. Understanding colour perception and preference. In: Best, J. (Ed.). (2012). *Colour design* (1st edition ed.) Woodhead Publishing. Retrieved from https://aalto.finna.fi/Record/alli.837067 (August 30, 2019)

Josef Frank. (n.d.) Retrieved from https://www.svenskttenn.se/en/ (September 13, 2019)

Kopacz, J., 2012. Enhancing design using color. In: Best, J. (Ed.). (2012). Colour design (1st edition ed.) Woodhead Publishing. Retrieved from https://aalto.finna.fi/Record/alli.837067 (August 30, 2019)

Küller, R., Mikellides, B., & Janssens, J. (2009). Color, arousal, and performance—A comparison of three experiments [Abstract]. *Color Research & Application*, 34(2) 141-152. doi:10.1002/col.20476 Retrieved from https://doi.org/10.1002/col.20476 (September 21, 2019)

Lam, R. W., Levitt, A. J., Levitan, R. D., Enns, M. W., Morehouse, R., Michalak, E. E., & Tam, E. M. (2006). The can-SAD study: A randomized controlled trial of the effectiveness of light therapy and fluoxetine in patients with winter seasonal affective disorder [Abstract]. *The American Journal of Psychiatry,* 163(5) 805-812. doi:163/5/805 [pii] (September 19, 2019)

Meesters, Y., & Gordijn, M. C. M. (2016). Seasonal affective disorder, winter type: Current insights and treatment options. 9 doi:https://doi.org/10.2147/PRBM.S114906 (September 21, 2019)

Oren, D. A., Brainard, G. C., Johnston, S. H., Joseph-Vanderpool, J. R., Sorek, E., & Rosenthal, N. E. (1991). Treatment of seasonal affective disorder with green light and red light. The American Journal of Psychiatry, 148(4), 509-511. doi:10.1176/ajp.148.4.509 [doi] (September 20, 2019)

Partonen, T., & Lönqvist, J. (1998). Season affective disorder. *The Lancet,* 352(9137), 1369-1373. (March 6, 2019)

Seasonal affective disorder. (2019). Retrieved from https://www.psychologytoday.com/intl/conditions/seasonal-affective-disorder (August 4, 2019)

Simpson, J. B., & Simpson, J. B. (1999). Winter depression: The SAD facts. CPJ. *Canadian Pharmaceutical Journal,* 132(1), 34. Retrieved from https://search.proquest.com/docview/221113892 (March 11, 2019)

Strong, R. E., Marchant, B. K., Reimherr, F. W., Williams, E., Soni, P., & Mestas, R. (2009). Narrow-band blue-light treatment of seasonal affective disorder in adults and the influence of additional nonseasonal symptoms [Abstract]. *Depression and Anxiety,* 26(3) 273-278. doi:10.1002/da.20538 Retrieved from https://doi.org/10.1002/da.20538 (September 20,2019)

Tani, N., Kareoja, P., korkeakoulu, T. j. s., School of Arts, D. a. A., laitos, M., Martikainen, O. Aalto-yliopisto. (2015). *Enhancing the spatial experience -Interweaving textile, human and architecture*.

Wright, A., 2012. Predicting responses to colour. In: Best, J. (Ed.). (2012). *Colour design* (1st edition ed.) Woodhead Publishing. Retrieved from https://aalto.finna.fi/Record/alli.837067 (August 30, 2019)

Visual references

Figure 1. Available from: http://gkshortcuts.blogspot.com/2015/05/trick-to-remember-colours-of-spectrum-of-white-light-VIBGYOR.html

Figure 2. Data: Azeemi, S. T. Y., & Raza, S. M. (2005). A critical analysis of chromotherapy and its scientific evolution. doi:10.1093/ecam/neh137 (September 19, 2019)
Illustration from Fiorenza Marani

Figure 3 - 9. Digital illustration designed through website: https://www.canva.com/templates/. Data collected from the Survey questions written by Fiorenza Marani

Figure 10. Digital illustration designed through website: https://www.canva.com/templates/. Data retrieved from: https://www.yths.fi/yhteystiedot/toimipisteet/helsinki

Figure 11. Digital illustration designed through website: https://www.canva.com/templates/. Data collected from the Survey questions written by Fiorenza Marani

Figure 12. Available from: https://www.verkkokauppa.com/fi/product/12279/fdcvv/Innolux-Rondo-LED-kirkas-valo?list=OZZ2NY9eurkCUZikZMEEJCU9d9CUZ6yMxfa3O4BKHhIwvcNN2KIZMpVaZ5gl0 ZxTkve (February 16, 2019)

Figure 13-17. Digital illustratio from Fiorenza Marani

Figure 18-21. Phot by Fiorenza Marani

Figure 22-26. Available from: https://stock.adobe.com

Figure 27. Available from: https://www2.hm.com/

Figure a. Available from: https://br.pinterest.com (June 1, 2019)

Figure b. Available from: https://www.sommertage.com/nuernberg-tipps/ (July 5, 2019)

Figure c. Available from:

Figure d. Available from: https://br.pinterest.com (June 1, 2019)

Figure e. Photo by Fiorenza Marani

Figure f. Available from: https://www.sommertage.com/aschaffenburg-tipps/ (July 5, 2019)

Figure g. Kallela Talvi by Akseli Gallen. Available from: https://leprincelointain.blogspot.com/2017/07/akseli-gallen-kallela-1865-1931-neige.html?spref=pi

Figure h. Available from: https://www.ikea.com/it/it/p/taernaby-lampada-da-tavolo-antracite-nero-60323894/ (June 1, 2019)

Figure i. Available from: https://stelline.it/it (May 2016)

Figure l. Available from: Photo by Fiorenza Marani

Figure m. Available from: https://www.fabricsandpapers.com/9802-meadow-leaf-floral-fabric-cobalt (August 3, 2019)